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Affordable, Advanced Environmental Monitoring

## The AVTECH Room Alert 3E Is Flexible & Feature-Rich In A Small Footprint & Costs Just $145

ENVIRONMENTAL MONITORING isn't new to IT and data center managers. In fact, most companies have purchased at least one, if not multiple solutions designed to warn you if the temperature or other conditions inside a rack are nearing a specified threshold. But these solutions vary wildly in terms of price, size, and feature-set, which can make it difficult to make changes to your overall system or cause you to lose focus on environmental monitoring altogether.

But it's more important than ever to extend the life of equipment, ensure efficiency, and prevent unnecessary damage to servers and other equipment through the use of environmental monitoring devices.

AVTECH has been working diligently over the past 25 years to not only make improvements to its own products but help move the entire industry forward and set new standards. With the Room Alert 3E, AVTECH has packed its years of experience and technological know-how into a smaller and more affordable solution that's full of new features designed to minimize downtime and give you a heads up before a small issue becomes a potentially larger problem.

Small Footprint & Price

With a footprint of about six square inches and a weight of two ounces, the AVTECH Room Alert 3E takes up much less physical space than most other environmental monitoring solutions. And it does so without skimping on crucial features. With such a small footprint, you can focus on where environmental monitoring is needed the most and quickly and easily implement a Room Alert 3E.
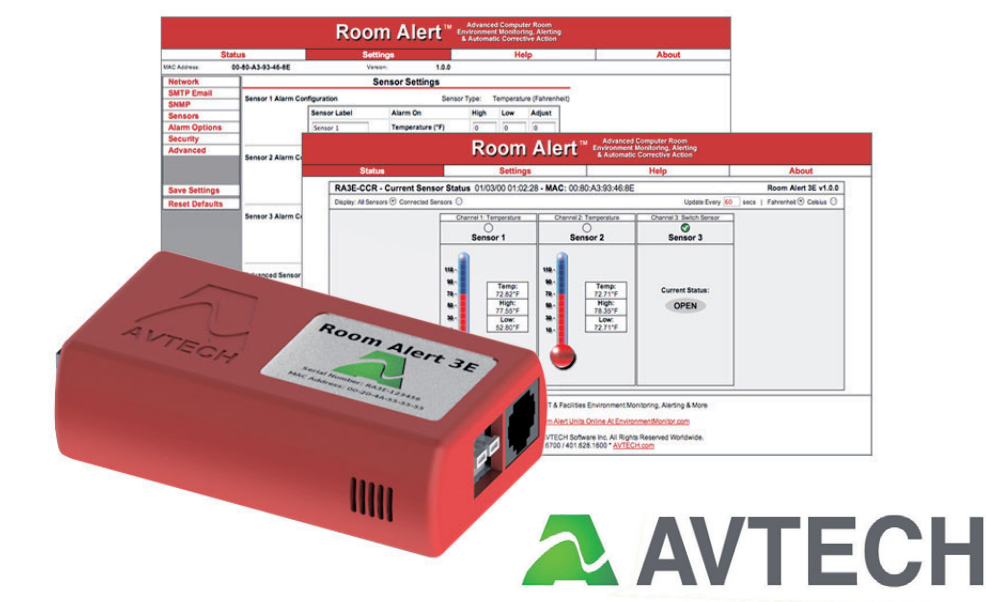
AVTECH says the 3E's $145 price tag will quickly pay for itself in downtime prevention. "When considering the total cost of IT equipment at an organization, the labor expense to replace equipment when it gets damaged, and the cost per minute of downtime for an organization, Room Alert 3E will be as valuable to an IT manager as an extra 15 minutes of oxygen is to a scuba diver," says Michael Sigourney, senior product specialist at AVTECH. "When things go bad, it's a life-saver."

Benefits From Experience

The Room Alert 3E is the 14th new model released since 1998. AVTECH was able to take everything from previous models, hone in on the most important features, and put them in a tighter package with a few extras.

The device has a built-in temperature sensor and a digital port for connecting an additional digital sensor for other environmental factors or a light tower and relay adapter, which can be shared by all Room Alert monitors across a network, Sigourney says. For power, you can take advantage of the built-in PoE capabilities or add an optional AVTECH 5v 1A power adapter for $15.

As with most other AVTECH environmental monitoring devices, the Room Alert 3E comes with AVTECH's powerful Device ManageR software. The software is used as an alternative to the built-in Web browser interface or a generic SNMP monitoring application, providing advanced discovery, management, alerting, logging, graphing, a dashboard interface, and more, Sigourney says.

With the Room Alert 3E, you can receive alerts via email, email-to-SMS, SNMP, Web page update, and more. Plus, Device ManageR takes advantage of AVTECH's new PUSH technology, which lets you configure Room Alert monitors to send event data outbound from within a secured network to Device ManageR on a different network for alerting and auto-response. This allows organizations to monitor across multiple networks securely, without inbound network access. Device ManageR also lets you combine network cameras with Room Alert devices and see unlimited camera views in a single screen, snapshots and video links in alerts, says Sigourney.

Flexibility & Support

The Room Alert 3E is flexible both in terms of size and feature-set. You can choose to purchase one device for a single use, implement one or more devices into an existing system, or build an entirely new environmental monitoring infrastructure complete with in-depth management software. AVTECH backs up its products with world-class customer support, which is free of charge for the first year and can be renewed on annual basis for a small fee.

"AVTECH's Maintenance, Support & Update Service (MSUS) program provides our customers with unlimited technical support; download access for firmware-software-MIBs, which typically includes two to four updates a year; and provides our 100% replacement guarantee for the Room Alert monitor," Sigourney says.

In many cases, Sigourney says, the cost of an MSUS plan comes down to pennies a day and even less per unit if they purchase multiple Room Alert 3E devices. It's just another sign of AVTECH's commitment to its customers, which now number more than 110,000 in 106 countries. "We're proud of our MSUS program and appreciate every single customer we've had the privilege to earn." P

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> *- AVTECH's Michael Sigourney*

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- ❑ Bi-weekly
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- ❑ Quarterly
- ❑ Annually
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Realize Your Data Center's Full Potential

Are You Making The Most Of Your Capital Investment By Taking Advantage Of All The Capacity Available?

GREEN COMPUTING is all the rage. Manufacturers are touting their latest wares with messaging that promotes saving energy. And data center managers are working hard to make sure the equipment they purchase meets "green" goals set by higher-ups.

But in the race to meet those goals, it's easy to overlook the data center itself and what can be done to realize the full potential of the capital investment you've made without putting the IT service at risk.

"Green data center operations are important, but isn't the greenest data center the one that you don't have to build?," asks Sherman Ikemoto, Future Facilities general manager, North America.

By focusing on capacity management, especially the long-term impact of an ever-changing IT configuration, capacity utilization rates can increase from the typical 60 to 70% found in today's data centers to 90%+ utilization, he says. "Higher capacity utilization rates across the industry would reduce the need for one data center out of every four built."

The Fragmentation Problem

Losses in data center capacity are due to fragmentation of space, power, and cooling over time and do not become obvious until well into the operational life of the facility.

Fragmentation occurs because a typical owner/operator will almost certainly break
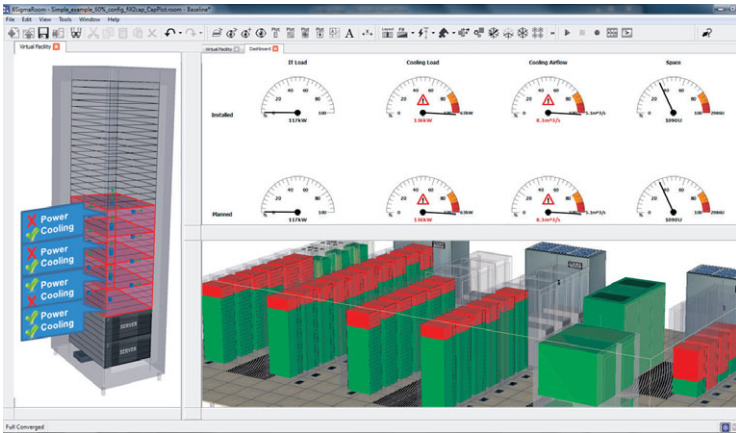
the original IT load layout planned during the design of the facility. One example is that a facility manager will often assume a 3kW load of blade technology in a cabinet will have the same impact as 3kW of standard server hardware. But while the power draw is the same, the airflow requirements are different, leading to cooling imbalances and fragmentation.

Because of this fragmentation, large swaths of space often are not being utilized because the facilities manager is afraid of potential hot spots due to lack of available cooling. Many believe that the main reason for such losses is because owner/operators are not effectively monitoring their assets, power, and environment. Because of this, the current market panacea is DCIM tools. However, while accurate monitoring is good and an essential part of

managing the facility, it will not help with the losses due to fragmentation.

Future Facilities' approach differs from other DCIM tools by integrating simulation capabilities using predictive DCIM. "Predictive DCIM is based on simulation techniques that view the engineering impact of any future IT load configuration prior to implementation, thus helping in reducing compute capacity losses and IT equipment resilience issues," Ikemoto says.

If the model predicts that capacity will be destroyed, an engineering fix can be incorporated to avoid the damage that would have been done. Ultimately, "you want to exhaust all your resources at the same time," something that's tricky "unless you can see how [space, power, and cooling] relate to each other and to the IT configuration."

A Better Future For Facilities

6SigmaFM offers a way to predict and visually show how data center changes will influence space, power, cooling, and capacity. "It's like being able to walk into your

real data center and see space, power, and cooling availability and then identify why they have gone out of alignment and how to realign them so that capacity is always available where you need it," Ikemoto says.

6SigmaFM uses CFD (computational fluid dynamics) analysis to simulate airflow and cooling. This is integrated with space and power simulation to show how cooling—the invisible aspect of capacity—is redistributed relative to space and power.

And 6SigmaFM and its related tools work for new data center builds as well as for ones that have been in operation for years, Ikemoto says, helping a data center "establish a new roadmap where it not only upgrades and changes IT equipment as usual but integrates solutions to reclaim capacity as it goes." P

FUTURE FACILITIES 6SIGMAFM

(408) 436-7701
www.futurefacilities.com

Combines computational fluid dynamics analysis and space and power simulation to give users a way to predict and visually show how data center changes will influence space, power, cooling, and ultimately capacity.

Cooling That's Effective, Affordable & Energy-Saving

Evaporative Cooling Completely Eliminates Need For Compressor-Based Systems

ONE OF THE BIG NAMES in server manufacturing recently released a new generation of servers that will work very well under the new ASHRAE TC 9.9 guidelines for data center design and operation.

This new generation of servers can handle temperature extremes of up to 45 degrees Celsius, or 113 degrees Fahrenheit, for up to 90 hours per year. One of the rationales behind marketing the server at those conditions was to allow fresh air cooling in virtually the entire continental United States. Other research has indicated that the servers can

operate 87% of the year in Washington, D.C., using fresh air cooling alone.

Energy-Saving Potential

The energy-saving potential of raising the inlet temperatures that high can be enormous. Instead of running chillers or compressors 8,760 hours a year, they are only operating 1,138 hours per year.

It's difficult to put that into numbers, but here's a little example:

If the server power consumption is 300 watts, then the cooling system must

remove 300 watts times 8,760 hours per year or 2,628kWh of heat (8,961,480 BTU). That can be accomplished using mechanical cooling, fresh air cooling, or a combination of the two.

A pretty efficient compressorsized HVAC system will remove about 4.5 watts of heat per watt of electrical energy used. So to cool the new server using mechanical cooling will require 2,628,000 watts of heat divided by 4.5, or 584kWh of compressor power.

To cool that same server using fresh air for 87% of the year will only require 75.8 kWh of compressor power. Of course, the fan energy stays the same in both cases, but the compressor savings of 508.2kWh per server can really start to add up.

At an aggressive electric rate of 4.5 cents per kWh, that amounts to $22.87 per server per year. At modest densities of, say, 40 servers per rack, the savings amounts to $915 per rack per year. Now consider how many racks are in the typical server room or data center. If the data center has a server load of 1mW, then a density of 40, 300-watt servers per rack will translate into 83 racks. So the annual savings would be almost $76,000 in this example.

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Even Greater Savings

To make the savings even greater, you could use the Aztec ASC indirect evaporative cooling system. Using the Aztec system completely eliminates the compressor-based cooling, adding another $3.50 per server per year of savings. That would add another $11,620 per year in savings for a total annual savings of $87,620 in this example.

Of course each climate and data center is different, and Aztec analyzes each case. But the reduction in operating costs are significant in every case that Aztec has studied.

Aztec and its sister company, Alton, have been in the evaporative cooling business for 66 years. Many of the evaporative cooling technologies that are just now being introduced to the market were developed more than 20 years ago by Aztec. Our experience, combined with our state-of-the-art controls, can assure you of the most efficient evaporative cooling solution available. P

Intelligent PDU Solutions From Industry Leaders

PDUs Direct & Server Technology Team To Provide Multiple Product Lines For Diverse Needs

YOU NEED GOOD, clean, consistent power for your data center, but how can you be sure that your valuable equipment is getting the power it needs? The only way is to employ reliable power distribution units to supply the power and to use appropriate monitoring units to ensure that the power you're getting is in fact clean, efficient, and consistent.

Of course, sometimes you or your customers need basic or metered PDUs that you can

PDUs Direct & Server Technology

www.pdusdirect.com
www.servertech.com

- PDUs Direct specializes in power distribution units that are simple, efficient, and affordable for data centers with basic needs.
- Server Technology's PDUs and Sentry Power Manager software meet more sophisticated needs to provide and monitor power to mission-critical devices.
- The companies work together to provide multiple product and service channels and exactly the resources that will provide the best value and customer service for all their customers.

Server Technology
Solutions for the Data Center Equipment Cabinet

PDUs direct

set up and use quickly, with minimal complications. At other times, more complex problems call for more sophisticated solutions, and those can require more thought and more advanced units—and often more help acquiring and configuring those units. You need a PDU vendor you can trust, whether you're seeking a simple, economical power delivery solution or looking to equip a large data center with state-of-the art power distribution and monitoring.

Either way, PDUs Direct and Server Technology are there for you. Two companies selling the quality, reliable and trusted Server Technology products, PDUs Direct and Server Technology can work together to help you meet the power and monitoring needs of data centers large and small. Whether it's an enterprise-class multi-facility data center or a tiny server closet, PDUs Direct and Server Technology have what you need. The two companies want to provide the best customer service and options, no matter how you choose to buy. And that's what PDUs Direct and Server Technology have accomplished.

Simple, Reliable PDUs, Shipped Quickly

For simple, fast, and affordable power distribution, turn to PDUs Direct (www.pdusdirect.com). As a longtime leader in low-cost, fast-shipping PDUs, PDUs Direct's expanded offering includes affordable basic and metered PDUs as well as select switched models. PDUs Direct has been selected as the Master Distributor for Server Technology on

select products and will utilize a distribution channel and reseller channel to deliver products to customers.

Whether it's a simple 20A server rack power strip with 12 NEMA 5-20R outlets or a rackmount 30A 208V power strip with 24 IEC C13 outlets, PDUs Direct has what you need. A selection of more than 80 basic metered and switched units, PDUs Direct has your customers' most straight forward power distribution needs covered nicely.

As an approved GSA reseller, PDUs Direct provides some of the lowest-cost power distribution units in the industry and ships them the day after the order is placed in most cases. When your needs—or your customers' needs—are clear-cut, turn to PDUs Direct for quick delivery of dependable, Basic Metered and Switched PDUs.

More Sophisticated Tools For More Complex Operations

Need more? More sophistication? More features? More help? Server Technology (www.servertech.com) is there to provide the premier models of the most sophisticated PDUs and monitoring solutions currently available. Server Technology's PDUs provide more intelligence, switched and smart PDUs, per-outlet monitoring, and more productivity—and Server Technology can provide all the expertise you need to help you install and configure your PDUs.

For a better handle on PUE, you need more sophisticated delivery and monitoring units, and Server Technology provides them

in the form of POPS (Per Outlet Power Sensing) Switched PDUs such as the CWG-24V 3Ph PDU with 50/60Amp power distribution. Smart and Switched PDUs such as the CWG-24V can tell you if there's enough power available to add more devices or if you're close to exceeding the circuit's capacity. In addition, Server Technology's switched PDUs can control network access to remote sites and data center equipment via IP-based remote power management, and they can be configured to enable network access for remote power management to reboot servers and network gear individually or as a selected group.

Of course, complex technology requires sophisticated management. Server Technology's Sentry Power Manager is the most accurate system you can use to measure and monitor your power usage. It gives you the data you need to make critical decisions regarding your efficiency and carbon footprint, as well as temperature and humidity, at the rack level. Sentry Power Manager is the premium software solution for monitoring your network of sophisticated PDUs. Using SPM's Web-based interface, you can monitor and control your PDUs at the outlet level, view and print status logs, generate reports, and more, managing power distribution in a single data center, in centers across campus, or in locations around the world.

With Sentry Power Manager and Server Technology's sophisticated PDUs, you're in complete control of your complex power distribution needs. ℗

Repair, Don't Replace

It Is Possible To Extend The Life Of Your Legacy Equipment

LIKE MANY BUSINESSES, customers of Baynetwork Inc. faced a problem: They were making significant investments in network equipment and needed a way to squeeze the most value out of that expensive equipment.

Baynetwork, which resells fully warrantied and used routers, switches, firewalls, and other equipment, listened to the needs of its customers—and hundreds of other companies across the United States—and started its own in-house testing and repair department. That venture lead to the creation of IT Hardware Repair, or IT(HR).

"Companies that were looking to save money on their legacy equipment didn't always want to replace the equipment with a purchase but simply wanted to extend the life of their equipment with a repair," says Jason Sutherland, Web and marketing manager at IT(HR).

Simple Goal

IT Hardware Repair's goal is simple: To help companies keep their hardware replacement costs down by assessing network equipment and repairing it if it's worth repairing.

The company offers network equipment testing and IT hardware repair services for equipment from industry-leading vendors such as Foundry, Ixia, Juniper, Cisco, Bizfon, ShoreTel, and Brocade.

> "IT Hardware Repair prides itself on its in-house ability and industry-leading testing and repair guarantee."
>
> *- IT Hardware Repair's Jason Sutherland*

"Most all businesses utilizing premier brand network equipment and VoIP solutions can consider IT Hardware Repair first before purchasing an extended warranty or additional hardware replacement service license agreement," Sutherland says.

While the typical starting point for equipment repair is $250, Sutherland says, IT(HR) assesses the equipment and reports any problems before attempting any repairs or charges. IT Hardware Repair works with you to keep repair costs in line with your goals, and you won't get charged for anything unless you decide to proceed with the repair.

The Process

Most repair facilities outsource their equipment repairs, Sutherland says. IT(HR) handles repairs in-house.

"IT Hardware Repair prides itself on its in-house ability and industry-leading testing

and repair guarantee," Sutherland says. The company knows that data security is of utmost concern and uses dedicated engineering test stations and equipment racks to ensure complete separation and data integrity.

The testing and repair process is simple:

1. Open a ticket. From the IT Hardware Repair home page, click the Request-A-Quote button. If you need backup equipment to minimize downtime during the repair, be sure to take advantage of IT(HR)'s relationship with Baynetwork to get that equipment at an affordable rate.
2. Ship or deliver your equipment to the IT(HR) facility in Menlo Park, Calif.
3. IT(HR) experts will test and evaluate the equipment. After evaluation, you'll be notified of the repairs needed and costs.
4. Based on your response, IT(HR) will repair the equipment or return it to you.
5. After conducting repairs, the team will test and reconfigure equipment.
6. You'll receive your equipment back, along with an invoice.

Long-Term Savings

IT(HR)'s services can benefit almost any enterprise with equipment in need of repair, including midsized enterprises, educational institutions, hosting providers, and small startups. Most customers have a common problem, Sutherland says: They've reached the warranty terms on their network equipment or no longer want to pay for a separate outside service contracts.

Trevor Lea, STMicroelectronics staff engineer, says IT(HR) was the perfect, cost-effective solution for repairing and upgrading STMicroelectronics' aging traffic generators. "Their repair department is professional, knowledgeable, accommodating, and responsive, which is everything you look for in a good service organization." ℗

Company Name:
IT Hardware Repair, a division of Baynetwork Inc.

Location:
Menlo Park, Calif.

Phone: (877) 462-6674

URL: www.ithardwarerepair.com

IT(HR)
HARDWARE REPAIR

FEATURED PRODUCT

Instant Search, New Features

dtSearch Version 7.70 Enhances Document Filters, Supporting A Range Of Data Types

DTSEARCH CORP. has taken its industry-leading enterprise and developer text retrieval to a new level with its Version 7.70. The release enhances dtSearch's proprietary document filters. These provide data parsing, conversion, and extraction in the dtSearch product line, and they are also available for separate licensing. The filters support Office documents, emails plus nested attachments, static and dynamic online data, and databases.

Instantly Search Terabytes Of Text

dtSearch products make it easy to instantly search terabytes of text, spanning directories, databases, online data, and emails. The products can index over a terabyte of text in a single index, and create an unlimited number of indexes and search them. Indexed search time is typically less than a second, even across terabytes of data. Online indexed searching operates in a "stateless" environment, supporting unlimited concurrent search threads.

Among the most important features of the dtSearch product line are its support for 25+ full-text and fielded data search types, including special forensics search options. In addition, dtSearch products offer federated or distributed searching with integrated relevancy ranking across any number of different data repositories.

Document Filters

dtSearch's proprietary document filters support a broad range of data types:
- Office documents: MS Office, OpenOffice, RTF, PDF, etc.
- Emails: MS Exchange, Outlook, Thunderbird, etc., all with nested attachments
- Compression formats: ZIP, RAR, GZIP/TAR, etc.
- Web-ready data: HTML, XML/XSL, and PDF
- Dynamic data: PHP, ASP.NET, CMS, SharePoint, etc.
- Databases: SQL including BLOB data (through the dtSearch Engine APIs), MS Access, XBASE, XML, CSV, etc.

The document filters support parsing of all of the above data types as well as text extraction and/or conversion to HTML as required for browser display with highlighted hits.

Embedded image enhancements. Version 7.70 extends the document filters to add image support to Word (.doc/.docx), PowerPoint (.ppt/.pptx), Excel, (.xls/.xlsx), Access (.mdb/accdb), RTF, and email files, including Thunderbird (mbox/.eml), and Outlook (.pst/.msg) files. The new version displays these formats with highlighted hits in context with both text and images.

Multi-level nested file enhancements. The dtSearch document filters also support documents and images in multi-level nested configurations. For example, Version 7.70 supports not only viewing images in an email file, but also images in a PowerPoint embedded in a Word document attached as a zipped file to an email message. A new "object extraction" API lets developers navigate through the structure of each embedded object as a hierarchy, and optionally extract each object.

Other Features

Spider. The Spider works with local and remote, static and dynamic Web content. Hit-highlighted searching can span any level of site depth, across any number of public and private or secure sites, including support for log-ins and forms-based authentication. The Spider is built into the dtSearch product line and accessible through a .NET API for programmers.

Developer APIs. The dtSearch Engine SDKs include native 64-bit and 32-bit, Windows and Linux, C++, Java and .NET (through current versions) APIs. For customers in need of data parsing, conversion, and extraction only, the document filters are available for separate OEM licensing. P

CASE STUDY

Committed To Customers

PDU Cables Has Met BCEI's Cabling Needs For More Than 20 Years

HOUSTON-BASED BURR COMPUTER Environments Inc. (BCEI; 281/374-8644) has been in business 24 years as an engineering-based construction management company specializing in the engineering and construction of data centers and other mission-critical environments. For 20 of those years, BCEI has relied on PDU Cables to supply the power cables that BCEI installs in the facilities that it constructs.

Customer-First Mentality

A customer doesn't forge and maintain a relationship stretching on for two decades with a supplier without sharing core business beliefs and without having a solid trust in that supplier.

"PDU Cables is run in a manner similar to BCEI," says Greg Sawyer, director of electrical engineering at BCEI. Sawyer says BCEI and PDU Cables share a customer-first mentality that involves keeping products and services flexible to the customer's growing needs within its particular market. "By expanding their growth in products within industry, [PDU Cables] is able to stay abreast of the product trends within that industry," Sawyer says. "If you expand beyond the market into different industries, you're at risk of becoming a 'jack-of-all-trades, master of none,' and your service quality suffers."

BCEI purchases branch circuit power whips and colored conduit from PDU Cables, along with the company's Air-Guard products. The line of airflow-management brush grommets for data center raised floor installations are used to seal access holes to minimize cool air loss. Additionally, the Air-Guard products improve static pressure, a condition that enables data center equipment to run cooler and enterprises to ultimately realize energy savings.

Power Distribution To The Floor

BCEI initially turned to PDU Cables because it was seeking a faster, more cost-effective method for delivering power distribution to the data center floor than the traditional approach of using electrical contractor-built cables, Sawyer says. While the cable quality from electrical contractors varies in quality, Sawyer says, the cable quality that PDU Cables provides remains consistent among all jobs.

"Typically power cables are the last piece of the construction process and are often built by the least experienced electrician in the field because they are easy," Sawyer says. "By purchasing PDU Cables' power cables, the quality shows the client we aren't cutting corners on the pieces that are hidden under the raised floor." Sawyer says despite other cable companies offering similar products, "I have greater confidence that PDU Cables orders will be received and installed correctly every time and at the delivery date they promise. The shipping containers their cables come in are sturdier, ensuring less risk of damage during shipping."

Performance & Reliability

PDU Cables' power whip cables are available in hundreds of custom configurations for under-floor and drop-down power configurations. They're also UL Listed, labeled, manufactured with industrial-grade material that meets UL Standards, and 100% tested and checked in the factory for performance and reliability. Equally important is that PDU Cables can manufacture and ship its power whips within 24 hours of an order being placed.

Sawyer says due to his trust that PDU Cables' labeling will be correct and complete, BCEI can reduce its engineer inspection time. Further, Sawyer says he also doesn't "have to search each cable under the floor to verify an electrician labeled everything correctly."

Overall, Sawyer rates PDU Cables' support, training, and other departments as "second to none." In fact, during BCEI's 20-year relationship with PDU Cables, Sawyer says, he only recalls one problem that involved a shipment. PDU Cables, however, "went out of its way to fix the problem and ship a cable as quickly as possible at their cost."

Adapting To Customer Needs

When the two companies began working together, PDU Cables only offered blue-colored liquid-tight conduit, Sawyer says. In 1996, however, BCEI had designed an A-B electrical distribution system that required the use of another color to keep cabling separate and easily identifiable. PDU Cables, he says, adapted to BCEI needs and later expanded its cabling offering to six colors. In 2005, BCEI was working on a project and needed to expand beyond the six color options PDU Cables was then offering, Sawyer says. "They delivered, and now, I see there are 11 colors available. I doubt we'll need more than that, but who knows." P

FEATURED PRODUCT

Double Your Data Center Capacity

Power Assure PAR4 & EM/4 Help Collect & Analyze Data So You Can Improve Efficiency & Performance

How much power do your servers use? Are they using that power efficiently? How do you know? Those are the types of questions the Power Assure PAR4 measurement service can help answer. And, when combined with Power Assure EM/4 data center infrastructure management software, you'll be able to quickly visualize, identify, and remedy inefficiencies in a comprehensive way.

Better Efficiency

Energy efficiency isn't new to data centers, and they can become more efficient through two major areas, according to Clemens Pfeiffer, CTO and founder of Power Assure.

Power Assure EM/4 & PAR4

(888) 225-1575
www.powerassure.com

By using both the EM/4 data center infrastructure management tool and PAR4 measurement service, data centers can make the best use of their available space, power, and cooling.

POWER ASSURE

The first area is in the energy consumed by IT resources, especially servers. Current server utilization rates hover about 10% for dedicated servers and 20 to 50% for virtualized servers, Pfeiffer says. "The only thing servers do when they are underutilized, which can be up to 80% of the time, is waste energy—and money," he says.

The second area where data centers can achieve greater efficiency is in the need to dissipate heat created by IT resources. In most data centers today, cooling consumes about as much energy as the IT equipment, Pfeiffer says. Adopting a hot aisle/cold aisle configuration and raising the cold aisle temperature to 80.6 degrees Fahrenheit are a start, but doing so can create the risk of hot spots forming without careful and continuous monitoring.

Powerful Combination

The PAR4 measurement service tells you exactly how much power a server uses at four power levels: powered off, idle, fully loaded, and at peak. "This is invaluable data—not estimates—collected using the Underwriters Laboratories (UL) tested PAR4 methodology (UL2640 standard)," Pfeiffer says.

By making decisions based on these "true consumption numbers," Pfeiffer says, enterprises "can often double data center

compute capacity and eliminate the need for building costly new facilities."

At first glance, Power Assure EM/4 may look like any other DCIM system. It supports both the industry-standard and popular proprietary protocols used to measure power consumption, which means there are no special agents to install or extra wires to run to measure power at the building, circuit, and device level, Pfeiffer says. EM/4 also measures environmental conditions, such as temperature, humidity and airflow, throughout the data center.

But EM/4 sets itself apart through advanced capabilities such as auto-discovery, real-time monitoring, capacity planning analytics, BMS (building management system) integration, comprehensive reporting, and the ability to automate processes in cooperation with load-balancing or virtualization systems to continuously match server capacity with demand.

"The ability to match server capacity with actual demand in real-time is unique to EM/4," Pfeiffer says. Plus, he says, EM/4 accommodates the needs of both IT and facility managers as it's available with basic, advanced monitoring, and enhanced analytic modules targeted at the specific needs of either the IT manager or the facility manager.

"To prevent data centers from being outgrown by exhausting available space, cooling, or power (every data center manager's worst nightmare) it is necessary to both minimize and constantly manage the energy consumed," Pfeiffer says. "The combination of EM/4 and PAR4 are unique in their ability to enable IT and facility managers to accomplish both tasks easily and effectively." P

Faceplate	PAR4

By using PAR4, this 10kW rack was able to go from having the power maxed out while only half full to being full and still having power left to spare.

▌ Enterprises Face Mobile Challenges

Because of the increased popularity of tablets and functionality of smartphones, much of the network traffic and corporate data that was once the primary domain of enterprise PCs is now being shifted to mobile devices, according to research firm Gartner. "Securing corporate data on mobile devices is a big challenge, but one that companies must embrace," says Phil Redman, research vice president at Gartner. "Enterprises are struggling with how to support and secure this dynamic workforce."

Gartner offers several predictions for the mobile market in the coming years:

- **65%** of enterprises will adopt a mobile device management solution over the next five years for their corporate liable users.

- **90%** of enterprises will support two or more mobile operating systems, at least through 2017.

- **Apple's iOS** continues to gain in the enterprise space, with many companies having moved to it as their main mobile device platform during the past year and many more enterprises expected to standardize on iOS in the next 12 to 18 months.

- **Tablets** have been one of the fastest-growing enterprise devices in the past 18 months. Most companies and users are supporting tablets for limited usage, but users are pushing for support for more enterprise applications.

▌ Research Shows How Hyperconnected We Are

Recent research from the Pew Internet & American Life Project, which focused mainly on how technology and multitasking affects Millennials, indicates that more people (52% of those surveyed) believe tech-influenced changes in how we juggle personal- and work-related tasks will produce positive outcomes. A minority (42%) anticipates negative outcomes. The research also provides a snapshot of just how hyperconnected we are, as the following stats indicate.

69% Use social networking site(s)

59% Share photos and videos

37% Contribute rankings and ratings

33% Create content tags

30% Share personal creations

26% Post comments on Web sites and blogs

16% Use Twitter

15% Maintain a personal Web site

15% Remix content

14% Write blog posts
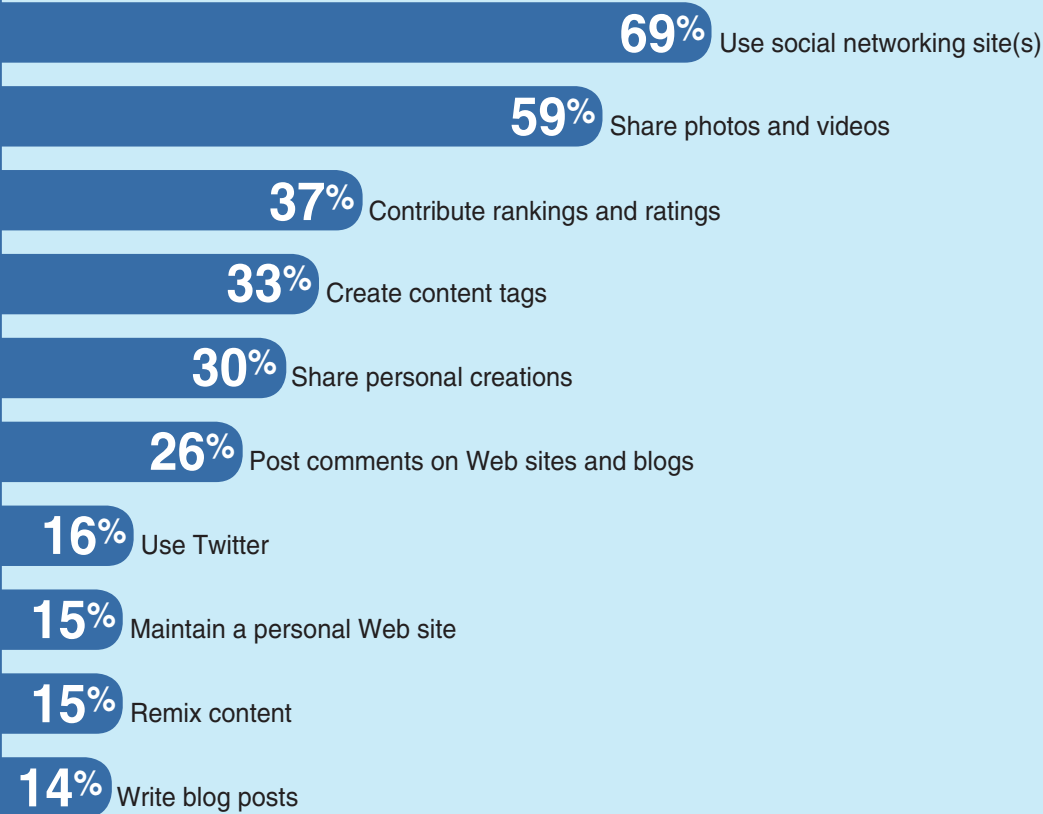
▌ Market For High-Performance Servers Remains Flat

Although revenue in the worldwide high-performance computing server market dropped slightly year-over-year during the second quarter, IDC maintains that the overall market will grow 7.1% this year to reach $11 billion. During the second quarter, revenue was down 0.9% compared to a year ago, and shipments dropped more than 21%. Revenue in the market for high-end HPC systems, classified as those selling for $500,000 or more, was up 21.8% from the first quarter. But revenue in the workgroup HPC market, or those selling for less than $100,000, was down 13.9% from the first quarter.

▌ Survey Shows Two Sides To Public Cloud Services

The increased adoption of public cloud services is cannibalizing IT services spending, particularly in the data center, according to Bryan Britz, research director at Gartner. But at the same time, he says, "Public cloud adoption offers service providers the opportunity to accelerate externalization of spending for the non-public cloud workloads and IT operations and service management responsibilities in tandem with clients pursuing a public cloud initiative." Gartner research shows that 19% of organizations are using cloud computing for most of production computing, and 20% are using storage as a service for all, or most, storage requirements. Public cloud adoption varies by service, Gartner reports, with IaaS (infrastructure as a service) moving into production environments. Adoption of PaaS, or platform as a service, shows the growing importance of public cloud services for organizations that are adopting cloud infrastructure. SaaS (software as a service) adoption continues to reduce the total market available for application outsourcing, according to Gartner.

▌ Government Saving Billions In IT Spending

The government will save about $2.5 billion over the next three years by consolidating systems, buying in bulk, and ending or streamlining off-track projects, according to Jeffrey Zients, deputy director for management at the Office of Management and Budget. The savings are part of PortfolioStat, which is the "coordinated effort" federal government agencies are undertaking to "scour their IT budgets to find unnecessary IT spending and develop a plan to root out waste," Zients says. As part of PortfolioStat, he says, agencies are collecting and analyzing baseline data on 13 specific types of commodity IT investments, including infrastructure, business systems, and enterprise IT.

Tech Industry Gains Jobs

In the first six months of this year, the high-tech industry added about 100,000 jobs, according to the latest job report from the TechAmerica Foundation. And, in the 18 months studied for the report, the tech industry added jobs in 16 of the months, with the total number of jobs in the high-tech field growing 3.3%, to about 6 million jobs. "While the growth has been modest, it is up and fairly consistent," says Matthew Kazmierczak, senior vice president, TechAmerica Foundation. The report looked at jobs in four sectors: tech manufacturing, communications services, software services, and engineering and tech services. The number of jobs increased in all sectors except communications services, according to the report.

Poll: Microsoft Needs To Build Awareness Of Windows 8

Microsoft has worked hard to "reimagine" the operating system with the launch of Windows 8, and it's at least on the radar for many enterprise planning departments. But awareness among consumers is lacking, according to a recent poll conducted by the Associated Press. According to the poll, 52% of adults polled in the United States have never heard of Windows 8. And, of those who have heard of the OS, just 35% think it will be an improvement over Windows 7, and 39% are interested in buying a new notebook or desktop with the OS installed.

Connectivity, Disaster Recovery Drive Ethernet Market

Revenue in the Ethernet market will grow from $5.2 billion this year to $9.2 billion in 2016, according to IDC. The biggest contributors will be high-bandwidth applications such as data center connectivity, disaster recovery/business continuity, and data storage replication, the research group reports. "Enterprises are increasingly utilizing 100Mb, gigabit, and even 10Gb Ethernet services for domestic and international WAN networking," says Nav Chander, IDC research manager, Enterprise Communication Services. The growth of Ethernet access as an alternative to leased lines for access to other services is also contributing to the growth in demand, Chander says.

Security Survey Reveals Weaknesses In IT Planning

The lead message from Ernst & Young's "Global Information Security Survey 2012" is that ad-hoc security solutions are no longer good enough for organizations attempting to keep modern cyber threats at bay. The annual survey, which this year involved 1,850 CIOs and other security executives worldwide, revealed that 31% of organizations were hit by "a higher number of security incidents in the last two years" and 77% agree "that there is an increasing risk from external attacks." Still, 63% say their organization does not have a strong security framework in place and a mere 16% indicate their current security measures meet their organization's needs. The report concludes that IT must improve not only to meet current threats, but also to address upcoming government and industry regulations.

PC Shipments Decline, Breaking 11-Year Streak

According to the latest statistics from IHS iSuppli Compute Platforms Service, the total number of PC shipments for the year will decline from 352.8 million units in 2011 to 348.7 million units in 2012. That is only a 1.2% decline, but it is significant in that it marks the first such year-over-year decline in the past 11 years. Craig Stice, senior principal analyst for computer systems with IHS, says there was hope for a rebound in the first half of the year, but "the usual boost from the back-to-school season appears to be a bust . . . and the industry is now training its sights on 2013 to deliver the hoped-for rebound."

U.S. Must Invest More To Lead In 4G, Consulting Firm Says

According to analysis from Deloitte put forth in a new report, "Airwave Overload? Addressing Spectrum Strategy Issues That Jeopardize U.S. Mobile Broadband Leadership," the United States needs to spend more on opening up more airwaves for cellular 4G networks if it is to maintain its leadership position in the global mobile broadband market. Deloitte suggests that increased investment should be judged along with corresponding benefits. According to Deloitte, increased investment could produce between 371,000 and 771,000 jobs and expand U.S. GDP between $73 and $151 billion over the course of four years through 2016.

Tablet Display Shipments Skyrocket In 2012 . . .

If you're looking for a good indicator of how strong the tablet market is right now, consider the latest figures from research company IHS about the tablet display market. According to IHS, manufacturers are expected to ship 126.6 million tablet displays this year, which marks a 56% increase over the 2011 total of 82.1 million tablet displays. IHS says that 59% of the shipments (about 74.3 million units) are in the 9.x-inch category, which is dominated by Apple's iPad.

In related news, citing continued consumption of tablet computers "in record numbers," IDC increased its forecast for global tablet shipments from 107.4 million units to 117.1 million units this year. Tom Mainelli, research director with IDC, indicates that the iPad leads the market, but says "there is room in the market for others to find success, and new Android- and Windows-based products shipping in the coming months will give consumers plenty of buying options during the holiday season." IDC also increased its 2013 forecast from 142.8 million units to 165.9 million units and expects total worldwide shipments to reach 261.4 million units in 2016.

. . . Signifying A "Multi-Device Era"

The latest research from IDC on global smart connected device shipments (PCs, smartphones, and tablet computers) shows that while PC shipments are in decline, smartphone and tablet shipments are on the rise. According to Bob O'Donnell, IDC program vice president for clients and displays, "The recent shipment data clearly demonstrates that we have fully entered into the multi-device era, where individuals are buying and using multiple devices per person, most often with different combinations of operating systems." IDC expects tablet shipments to increase the fastest (from 10% share of all smart connected device shipments this year to 13% in 2016) and forecasts continued growth for smartphones (from 59% this year to 63% in 2016). Overall, worldwide revenues for smart connected devices totaled $131.5 billion in Q2 2012.
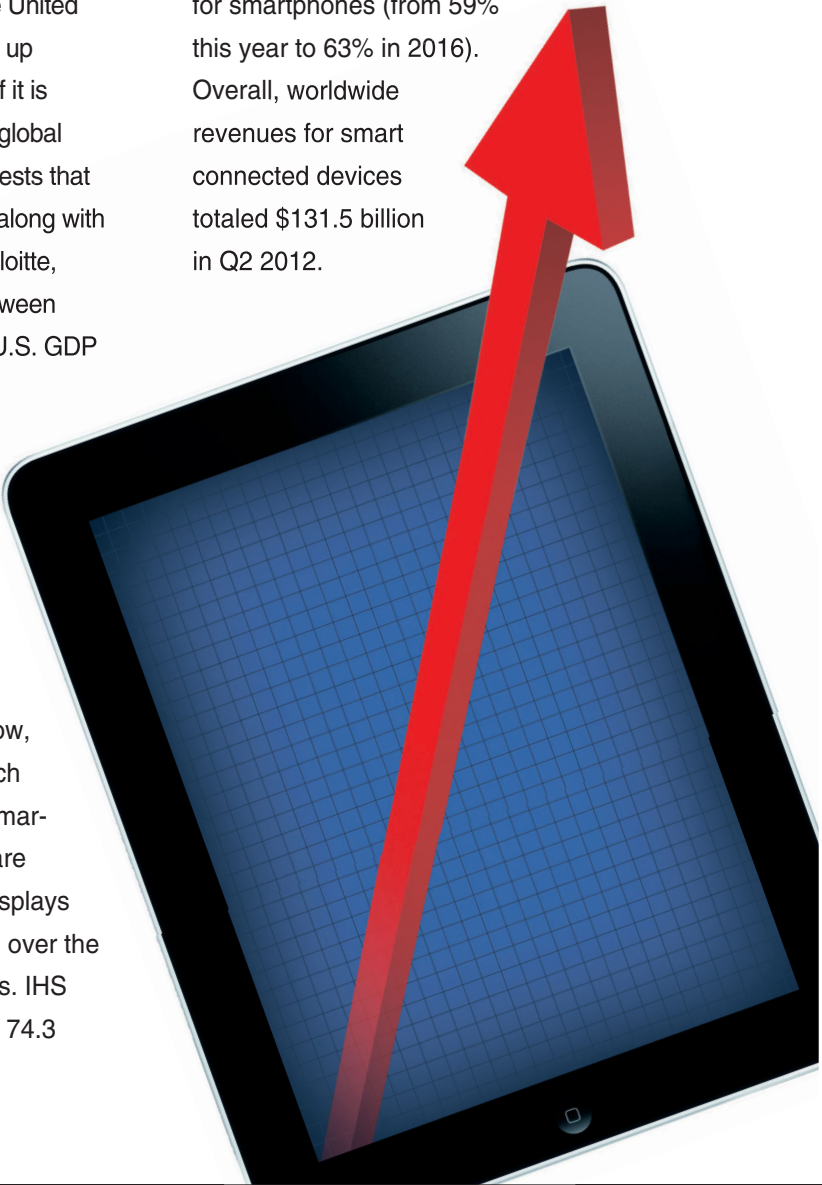
Upgrade Data Center Networking Equipment

Where To Start When Upgrading Core Network Components

CORE ROUTER AND SWITCH UPGRADES are among the top priorities for enterprise-level IT network managers in the coming year, according to data that TheInfoPro (a division of 451 Research) recently published as part of its Networking Reference Reports. Performing general technology refreshes ranked third among respondents' priorities. All these priorities relate to aging hardware, which the network managers surveyed identified as a top pain point.

Here are tips and advice to help identify the considerations and issues you should focus on when making upgrades in these areas.

✔ *Grasp The Problem*

Aging network equipment in the enterprise currently is a growing concern but not one that's yet urgent, says Alan Weckel, Dell'Oro Group senior director of data center appliance, enterprise telephony, and Ethernet switch market research.

The reason? "Many IT budgets have remained reduced since the economic recession in 2008-2009. This has led to the average equipment age in switching for the campus growing from three to five years to four to seven years," he says. Most switches were already able to support VoIP and WLAN, he says, thus, aging infrastructure isn't as pressing as it was in, say, 2003. "There hasn't been a new set of requirements that really can't be handled by current switches," Weckel says.

Eric Hanselman, research director, networks, at 451 Research, says because macroeconomic forces have kept companies spending cautiously for quite a while, organizations are "pushing equipment beyond the normal depreciation schedules to minimize capital spending." For mid-sized companies, he says, the credit crunch has been particularly acute, and the networking equipment that's still functioning ("much below its potential"), tends to be kept in service.

✔ *Understand The Importance*

In addition to aging equipment being more likely to fail, security is a primary reason why it's important for enterprises to address issues of aging network equipment. Upgrades are also important in order to keep pace with technology refreshes.

One example is the rise of BYOD adoption. Weckel says with BYOD, wired and wireless "in combination are more important than before."

Hanselman says security and performance are the largest drivers behind upgrading networking gear. "All equipment has vulnerabilities, and the firmware for older equipment may no longer be maintained to correct any security issues." Wireless access points are a particular area where performance gains have been made. "If an organization uses Wi-Fi in any volume, a simple upgrade to equipment supporting at least the 802.11n standard can improve employee productivity by offering support for greater mobile device density, better throughput, and better security," he says.
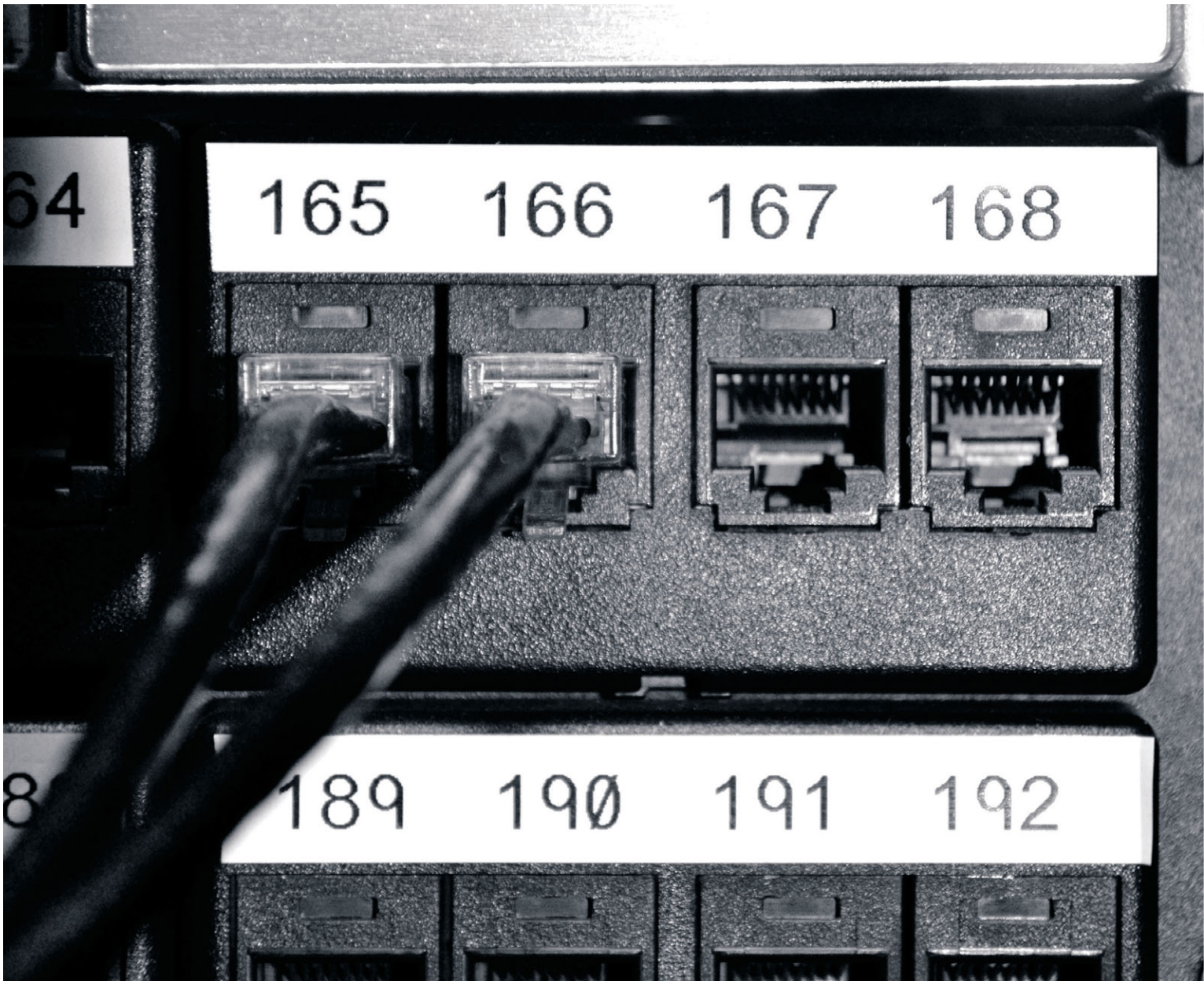
✔ Upgrade Cost-Effectively

It's important for small to midsized enterprises to look for ways to upgrade networking equipment cost-effectively. Hanselman says a first step is assessing the performance of the various components of the network. "Accumulating utilization information is important to both establish a baseline from which to look at long-term trends but also to help with troubleshooting in the event of sudden performance problems," he says.

Surveying networking performance can pinpoint whether core, edge, or access are areas that need attention. Wireless performance can be more complex to accurately assess, Hanselman says. Because the radio frequency performance varies with physical building constraints and the wireless devices involved, companies may need to enlist expert help. "Simply adding more access points can often make a bad situation worse," he says. Weckel adds that reducing spare capacity is the biggest way to cut costs.

One possibility for cutting costs when upgrading core networking gear is acquiring used or refurbished components. Hanselman says such gear can offer reasonable value, "as long as it's still actively supported by the manufacturer." Support, he says, must include the firmware and OS. "For some manufacturers, equipment components can be upgraded without replacing a whole chassis," he says. "Control or supervisory module upgrades may be available in both new and refurbished equipment." Weckel sees this approach more as an option for smaller enterprises, "as a switch from a Fortune 50 company that is three years old is still probably feature-rich for what an SMB may need."

✔ Keep Your Eyes Peeled

When upgrading core network equipment, you must have a solid plan. "There needs to not only be a plan for installation but also for an assessment of the results to ensure that all key applications are functioning correctly," Hanselman says. Also necessary is a rollback plan with a deadline that will kick off a return to the original configuration, he says.

Core upgrades usually involve improvements in interface speed, which means a change in cabling. Costs here can be considerable, Hanselman says, especially when adding fiber to what had been an all-copper environment. "Never underestimate the cost of simple things, such as patch panels and their installation," he says.

Weckel says it's important to know how quickly BYOD and cloud computing strategies will change, how your networks are architected, and where the data is located. "Proactive planning is the best way to mitigate typical problems. As is true with any technology, there is no way to avoid the future, as applications always catch the industry by surprise," he says. P

✔ Account For BYOD & Consolidation

BYOD is driving a different edge architecture than a few years ago, while data center consolidation is changing where data is located, says Alan Weckel, Dell'Oro Group senior director of data center appliance, enterprise telephony, and Ethernet switch market research. "Both put different stresses on the network that might not have been planned for when the equipment was purchased four-plus years ago," he says.

✔ Look To The Clouds

Before diving in and upgrading core network equipment, you should know where your enterprise's cloud computing strategy is headed, says Alan Weckel, Dell'Oro Group senior director of data center appliance, enterprise telephony, and Ethernet switch market research. "The core network needs to be sized (most likely down) as data center resources move toward the cloud," he says.

BONUS TIPS:

✔ Consult Application Users

When upgrading core network equipment, Eric Hanselman, research director, networks, at 451 Research, says key application users must be part of the decision-making process, including help in determining when performance problems happen and identifying traffic spikes. "Sometimes, simply shifting traffic can be enough to yield improvements," he says. Storage backups or virtual machine moves, for example, can consume lots of network capacity, he says. Correlating a network survey with user feedback is key to making efficient changes. Hanselman says the survey can be as simple as using open-source packet sniffers to record traffic rates and composition.

✔ Go To The Core

Core network upgrades can add capacity that elements at the network edge can leverage, Hanselman says. "This is a good investment if there is congestion in the core, and this is often the case," he says. "If access performance is a bottleneck, either for devices or for traffic headed to the Internet or wide area network, a core upgrade won't make a noticeable difference."

Save Money Using Green Strategies

Simple Ways To Lower Your Footprint & Increase Your Savings

IT'S WELL ESTABLISHED that putting green policies into place and using green strategies whenever possible are great ways to help the environment and lower a company's footprint. But there is also a financial benefit to implementing environmentally friendly initiatives, because companies can go green and save money in the process.

"With escalating energy costs, it is critical that IT put a concerted effort into keeping costs under control," says Simon Mingay, research vice president at Gartner. "The good news is that there is plenty of low-hanging fruit, most of which have quick payback periods."

It's important to take full advantage of green strategies, start early, and recognize the places where your company can improve. We'll show you few easy ways to boost your green efforts and save money in the process.

Utilize Existing Equipment Efficiently

One of the easiest ways to go green without spending any money on new products or solutions is to make sure your company is using existing equipment efficiently. It can be costly for companies to purchase new products on a regular basis, especially if they aren't truly needed. Additionally, regularly discarding older devices can lead to more e-waste, which, when not handled properly, can be detrimental to the environment. It's important to use what you

have efficiently and then decide whether you truly need new devices.

In his report titled "Save Money, Go Green, And Be A Hero By Shining A Light On The Office," Craig Le Clair, vice president and principal analyst at Forrester Research, writes that many companies are allocating devices, such as printers, more

Key Points

- Instead of replacing your current technology equipment or spending more money on new technology, make sure you are taking full advantage of your existing technology and using it efficiently.

- Measure every aspect of your company's overall energy consumption, starting with easier-to-measure metrics and moving up to more complicated ones. It can help you find out where you are wasting the most energy and, in turn, spending more money than necessary.

- Take advantage of green strategies that are quick and easy to implement. Later, you can invest in large-scale green initiatives, but in the short term, these smaller changes can start to add up.

liberally than necessary. In fact, he says that some companies have one printer for every two or three workers and that they are only used about 15 minutes in a typical day.

Keep in mind that these devices are more than likely constantly plugged in and drawing energy, which can lead to inefficient consumption and increased energy costs. And this idea goes for more than just printers. Data center components, including servers and other equipment, are always running, even when employees aren't there. It's relatively simple to find solutions that can both monitor the energy consumption and activity of infrastructure as well as give you insight into whether it is running at maximum efficiency.

Measure Energy Consumption Across The Board

If you want to see larger-scale, long-term savings from your green strategies, then you have to institute them in every aspect of your company. It's a good start to look at printers, desktops, and other productivity tools issued to employees, but if you go deeper into your company and find out where your infrastructure is running the least efficiently, then you can make changes that will save energy and money.

"Start measuring energy consumption and gradually increase the granularity of what you measure," Mingay says. "Start with the data center or server room, [and] separate out the IT and networking equipment from the cooling and power infrastructure. Then, move on to the rack level, eventually down to the server, and even the virtual machines. PUE (power usage effectiveness) as a metric is a good place to start, despite its frequent misuse."

Mingay says that some companies are even looking deeper than this and thinking about new ways to save energy and cut costs by increasing the efficiency of the building itself. "An example getting a lot of attention today is the use of IT to better manage buildings," including heating and lighting, Mingay says.

Make The Little Things Add Up

It's often more manageable to start small and then build up to whatever level your company is comfortable with. There are green strategies to implement at almost every level of the data center.

For example, if your company isn't able to fully embrace some of the larger-scale green initiatives, there are many smaller changes you can make that will add up in the long run. "There is so much low-hanging fruit that most organizations still have a long way to go before hitting the commercial limitations," Mingay says. This means that there are a lot of simple strategies available that many companies aren't using. The key is to find which strategies are applicable to your business and taking advantage of as many of them as you can. It may not seem like much at first, but the energy savings and positive effect on the environment will often impact the future. ▣

Top Tips

The following tips were provided by Simon Mingay, research vice president at Gartner:

✔ If you do decide to invest in new equipment instead of maximizing the efficiency of existing technology, make sure the product's energy efficiency promises match specific criteria; for instance, servers with lower kilowatt-hour power consumption are greener than other alternatives.

✔ Consider DCIM (data center infrastructure management) tools as part of building an energy management capability across the entire IT infrastructure and support systems.

✔ Use cloud and virtualized solutions to minimize the need for more physical infrastructure onsite and lower overall energy costs by moving applications to the cloud.

Action Plan

■ First and foremost, set up goals for your organization related to green strategies. Institute recycling policies that will put employees in the mindset of helping the environment, which can lead to other, large-scale strategies in the future.

■ Look at every piece of equipment in the company, including servers, desktop computers, and other devices, to help you know where it's possible to put more green policies into place.

■ Make sure the green strategies you use are actually working correctly. Develop a system of tracking and managing green solutions to ensure that you are saving energy or resources whenever possible.

■ Take "being green" one step further and find new ways to "manage e-waste and put together guidelines on sustainable procurement," says Simon Mingay, research vice president at Gartner.

■ Plan for the long-term. Keep an eye out for new products that save energy and always be willing to put new green policies into place that will help the environment and cut costs.

Get Started

Where you start really depends on whether your company already has a few green strategies in place. If not, it's a good idea to come up with a few goals that will mentally prepare employees for thinking green. After that, you have to look at your company's infrastructure and see where you can make changes. For some companies, it's possible to go green simply by using existing infrastructure more efficiently, but for others, it may be necessary to invest in all new technology, which could potentially be expensive the short-term but would pay off in lower energy costs in the long-term.

Hot Aisle/Cold Aisle Containment

Improve Energy Efficiency While Lengthening Equipment Lifespans

IF YOUR DATA CENTER is considering a move toward hot aisle/cold aisle containment, it's not alone. Where improving energy efficiency in a potentially effective manner is concerned, this approach is rapidly becoming more popular, and for a good reason. By controlling air flow so that hot and cold air don't mix, data centers are lengthening the lifespan of their equipment while improving equipment performance. Further, cutting energy costs, increasing server density, and other benefits are possible. When considering installing such a setup, give the following tips some thought.

✔ Is It The Right Choice For My Data Center?

Both cold aisle and hot aisle containment are getting quite a bit of attention, but there also are advocates for trying other options before implementing containment. Given that, how can you know if this approach will benefit your data center?

"Although it may be difficult, finding examples of installations in like facilities and discussing the results with those users can help provide insight as to whether or not containment is appropriate and cost-effective for a particular site," says David Ruede, vice president of marketing at Temperature@lert (866/524-3540; www.temperaturealert.com). In these discussions, he says, be sure to find out whether adding containment uncovered some other ways to improve energy efficiency that you could try before containment.

Lars Strong, senior engineer with Upsite Technologies (888/982-7800; www.upsite.com), says he's often asked whether hot aisle or cold aisle containment is better. "The answer always depends on site conditions. In general, hot aisle containment is more efficient, provides longer ride through, and results in most of the room being in the cold aisle. However, cold aisle containment is much easier to implement because hot aisle containment requires a return path for the exhaust air back to the cooling units, which is difficult to impossible to implement in some computer rooms," he says.

✔ Take Care Of Cooling & Airflow Inefficiencies First

Improving the separation of conditioned supply air and hot exhaust air is always good for data centers, Strong says. The consideration, though, is how much separation is required.

"The law of diminishing returns quickly comes into play for most data centers with average densities of less than 8kW per cabinet. Full containment strategies are costly; for the average data center, the ROI case is not very compelling," he says.

That's why, before investing significant time and money into implementing hot aisle/cold aisle containment, it's best to take care of other data center cooling and airflow issues first.

"Aisle containment does not solve all problems and is not a panacea. Installation of either form of containment will not solve all temperature problems or produce efficiency improvements without taking additional steps," Strong says.

The best way to determine if full containment is necessary is to first implement several other airflow management best practices. Strong advises sealing all raised

floor penetrations, making sure you have the proper number and placement of perforated tiles, installing blanking panels, and ensuring you have the proper number of cooling units running or have reduced the fan speed as much as possible for units with variable-speed fans.

"These measures are not costly and, in any case, are prerequisites to the successful installation of full containment anyway so there is no lost effort starting with them," Strong says. If IT equipment intake temperatures cannot be maintained after implementing these measures, he says, then partial containment or full containment may be necessary.

✔ Get A Baseline

In order to judge the true impact of hot aisle or cold aisle containment, you need to have a firm understanding of how your data center or IT room is operating today, Ruede says. It's easy to forget that IT facilities evolve over time, Ruede says, so the performance of the environmental control systems may not be as efficient as when they were commissioned.

"One would be hard-pressed to understand the benefit and justify a reasonable return on investment (ROI) without having a baseline understanding of the current HVAC operating conditions to determine whether or not there are some inherent deficiencies in the operation, equipment, or design that would limit or negate any CAC or HAC implementation," he says.

✔ Know What Goes Into A Containment System

Although there are, of course, physical pieces of a hot aisle/cold aisle containment system, both Strong and Ruede agree that having a clear idea of your goals is the first step in implementing a system.

"For a containment strategy to be successful, it is important to define up-front what the goals are for the project, what can and cannot be realistically achieved," Strong says. Ruede agrees, adding, "Management support for adequate budget, schedule, and staff to plan, implement, and maintain the project throughout its life cycle" is key.

Along with management support, there are several other key elements, Ruede says:

- Cross-functional support and resources in the planning, installation, verification, and maintenance phases of the project.
- Well operating and managed HVAC and CRAC units and well operating and managed under-floor and rack airflow paths.
- Preinstallation baseline of current environmental operating conditions and performance.
- Attention to detail during the planning, installation, and operational phases of the project.
- Post-installation baseline of environmental operating conditions and performance to determine energy savings and ROI. Ideally pre- and post-baseline comparisons are taken during seasonal extremes to best understand performance and ROI under all conditions.

Wrapping it all up with a management review of results and making any resource adjustments as needed can ensure the investment has the desired impact, Ruede says. P

✔ Have A Thorough Understanding

Mike Bullock, lead engineering consultant at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says that some form of containment is being implemented in most new projects his company sees. The advantages for both approaches are the same: increased cooling and heat removal efficiency and reduced overall costs. Hot aisle containment directs the hot exhaust air back to the cooling source, keeping it isolated from the rest of the room, and is considered easier to implement as a drop-in solution into an established room. Cold aisle containment directs the cold air to the rackmounted equipment intake area in front and requires careful planning and design for floor height, vented tile locations, CRAC locations, and hot air return.

✔ Hot Or Cold?

"We are still seeing a split between proponents for the hot vs. the cold aisle containment design, but the goal and end result is the same," says Mike Bullock, lead engineering consultant at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "Either design seems to be considered by all to be an improvement over the traditional approach."

BONUS TIPS:

✔ Containment Alone Does Not Improve Efficiency

Installing a containment system improves IT equipment intake air temperatures and reduces circulation of exhaust air, but containment alone does not improve efficiency, says Lars Strong, senior engineer with Upsite Technologies (888/982-7800; www.upsite.com). Installing containment creates an environment where efficiency can be improved, but you'll also need to change cooling unit set points to increase cooling unit performance. "Containment strategies also increase the number of hours per year that free cooling can be utilized," he says.

✔ Check Under The Floor

When checking for airflow inefficiencies and problems with poor air circulation, always perform a physical inspection under the raised floor.

David Ruede, vice president of marketing at Temperature@lert (866/524-3540; www.temperaturealert.com), points to a recent professional social media group discussion that asked if members would share the most unusual things they found under their raised floors. "There were many responses, quite a few of which would be cause for concern. (Hint: picnic coolers make wonderful airflow blocking devices)," he says. "Locating and addressing such issues before implementing containment will provide a baseline from which actual improvements in energy usage can be measured."

Troubleshoot Backup Problems

What To Do Before & After Issues Arise

THE FIRST STEP IN PROTECTING an enterprise's data is to consistently back it up. The next step is realizing that at some point, something will go wrong with those backups, and you're going to need to troubleshoot the snafu.

"If you don't have a good backup and recovery procedure in place, along with the right technology to support it, the likelihood is strong that one day, you will experience data loss and downtime," says Florin Dejeu, director of product management for Sepaton (508/490-7900; www.sepaton.com).

You need the right backup systems and troubleshooting tools, processes, and policies.

✔ *Understand Why Backups Fail*

Greg Schulz, senior advisor with Server and StorageIO Group, says backups can fail for many reasons, including issues tied to media (tape, disk, tape or disk drives, etc.), backup software, network and security, application settings, and cloud-based solutions. More important than understanding why backups fail, however, is determining where the "real problem" resides, Schulz says.

"Part of troubleshooting comes back to what is the problem? What caused the problem, but more importantly where is the real problem?," he says. For example, on one level a disaster (fire, flood, dropped drive, etc.) may have damaged the backup media, but the data may still be recoverable. On another level, however, you may find that although you can still read, copy, and work with the data, you can't actually open a file because it's in need of repair. "You need to have the insight to know where the problem actually is. What's the real problem so you're not spending your time chasing ghosts or false problems," Schulz says.

According to Mike Karp, vice president and principal analyst with Ptak, Noel, and Associates, the No.1 problem related to backups is that data isn't always recoverable from backups. This can be caused by numerous reasons, he says, including media failure, incomplete backups that are missing data ("typically vital"), missing tapes, and an operator error during the backup process.

✔ *Verify Backups Work*

One thing that many data center and IT managers forget, Karp says, is that "when all is said and done, backups are not the important issue; what are important are recoveries." Karp says any site can perform backups readily enough, and in fact, many do backups reasonably well. "But how well do they know that what has been written to the tape is actually readable? This is simple enough to determine at the time of the backup," he says. Every backup program, he says, has a "verify" switch that's usable during backup, "but most places don't use this because of the constraints imposed upon them by backup window limitations. They simply run out of time and hope for the best. Sometimes the best isn't good enough," he says.

Restoring a backup and trying it out, Schulz says, is the "only way you can have certainty and confidence that you're going

to be able to use what was backed up or copied," no matter what type of storage you're using for backup—even in the cloud.

He says enterprises also should verify at all different backup layers that "whatever tool you used to copy or back up or move the data is able to read the data back." Whether that data is a Word document, PDF, PowerPoint, database, or any other format, "verify you can restore it and move it to a different safe area and that you can actually use it," he says.

✔ Automate The Process

One way to simplify backup trouble-shooting chores, Karp says, is to begin the process of moving from tape back-ups to disk-to-disk backups if you already haven't. "Restorations from disk-based backups are far more reliable, and in most cases are easier and faster, as well." Further, he says, "automate your back-up processes sooner rather than later, and if you are considering moving to a new backup solution, make sure that it not only automates the process but automates it according to your site's established set of best practices (assuming you have them)."

Schulz adds that for tape-based systems, tools available from various vendors can plug into an environment to perform automated testing and verification. "In the case of using a disc-based appliance—dedupe to disk, any sort of disc-based backup and archive appliance—this can be as simple as setting up scripts (if your backup tool doesn't support it automatically) to periodically test something to see if it's still accessible or readable or to do a comparison check."

✔ Invest In Deduplication

A typical enterprise backup environment contains a range of data types and manages a complex array of retention periods, regulatory requirements, and business continuity policies, Dejeu says, and most have a significant volume of data that cannot or should not be deduplicated.

"'All or nothing' deduplication technologies can be costly and inefficient in these environments because they either waste valuable processing resources on deduplicating this data or force companies to back that data up on a separate additional system with deduplication disabled," Dejeu says.

A more sophisticated technology corrects that and provides the ability to "tune" deduplication to optimize it for specific environments, he says. Byte differential, content-aware deduplication uses built-in intelligence to identify a subset of the backup stream that contains duplicate data based on its actual content.

It also provides flexible, "tunable" deduplication, provides administrators with a range of options for tuning the deduplication methodology to their specific mix of data types, Dejeu says. The technology can also automatically detect the type of data being backed up and apply the deduplication algorithm that is most efficient for that data type, offering more efficient use of processing resources and significantly more efficient capacity reduction than hash-based deduplication solutions. ℗

✔ Ensure You Can Meet Your RTOs

"Fast backup performance is only half the challenge," says Florin Dejeu, director of product management for Sepaton (508/490-7900; www.sepaton.com). You need to ensure your backup solution provides for the fastest recovery times. "A solution that keeps an intact (un-deduplicated) copy of the most recent backup for immediate restores and deduplicates older, less frequently needed data, is the obvious choice as data does not have to be rehydrated in order to be restored," he says.

✔ Test Your Backup Troubleshooting

Numerous factors go into determining how often an enterprise needs to test its troubleshooting processes, with the backup media type in use being one of the biggest factors, says Greg Schulz, senior advisor with Server and StorageIO Group. For media, Schulz suggests following and adhering to the manufacturer's recommendations.

"If you're using drives that spin down, what does the manufacturer or supplier recommend for periodic spin-ups to make sure if those drives are going to sit spun down for three years that, when you go to spin them up, they'll actually work," he says. Schulz also suggests implementing a proactive policy for randomly sampling and checking backup-related components. "If you encounter an error during that random sampling, you may want to check if it's one-off or during a subsequent sampling, is there another error," he says.

BONUS TIPS:

✔ Use Email Reminders

Greg Schulz, senior advisor with Server and StorageIO Group, says for backups in especially small environments where tools providing automated backup and testing functionality aren't feasible, "send yourself a reoccurring task in the email system once a month to schedule a restore job to an alternative location and then check what happened."

✔ Update Your Mindset

Schulz says a common trait among enterprises that perform backup and troubleshooting tasks well is that they recognize there's no such thing as a data or information recession. They also realize data and people are living longer and are depending on data longer and there are economic challenges. "They realize simply throwing technology at [backups] is not a complete solution, in particular if you throw new technology at an old problem, you see a new problem that looks like an old problem," he says.

Enterprises should use technologies in more effective and innovative ways, he says. "You need to go in and, using different tools and techniques across the board, rethinking what you're going to protect and how often you'll protect and for how long. Rethinking SLAs with customers, asking the tough question of, 'What do they want vs. what do they need?' They want zero downtime, but what are they willing to pay for it?"

SIX QUICK TIPS

How Are You Using Water In Your Data Center?

Metric From The Green Grid Helps To Improve Your Water Efficiency

WATER USAGE EFFECTIVENESS, or WUE, is a relatively new metric developed by The Green Grid, a non-profit organization consisting of more than 175 companies with the ultimate goal of helping companies be as efficient and environmentally responsible as possible.

The worst enemy of your overall WUE? Inefficiently using water to power and/or cool your data center. The many members of The Green Grid have come together to help data center managers figure out ways to monitor their data center water usage, take measures to improve the efficiency and effectiveness of water usage, and improve their WUE to save money and help the environment.

✔ **Why Worry About Water Usage?**

It may seem more important to focus on energy usage and the power consumption of data center equipment than to worry about how water is being used, but water can be a wasted resource just as much as electricity. Energy efficiency is important, and lowering power consumption is a great way to cut down on costs and help the environment at the same time, but it's only one part of the puzzle. The Green Grid created the WUE metric, as well as others, to bring awareness to widespread resource inefficiency in the data center world.

"Energy is one aspect of a resource used in the operation of a data center, water certainly is a resource that's used significantly," says John Tuccillo, president and chairman of The Green Grid. "The Green Grid extended its mission beyond energy efficiencies to resource efficiencies out of consideration of the other resources that are employed to have a successful, efficient, environmentally sustainable architecture for a data center."

✔ **Understand The Metric & Start Monitoring It**

WUE consists of two different metrics, which are outlined in White Paper #35, edited by Michael Patterson, The Green Grid's technology and strategy work group chair. To find your WUE, take your annual site water usage and divide it by the IT equipment energy used. The WUE$_{source}$ metric adds the offsite water used to produce energy in your data center to the onsite water usage and then divides it by the IT equipment energy used by your infrastructure. WUE is great for figuring out how well you use water on-premises, while WUE$_{source}$ takes an extra step and provides detail for outside water energy sources as well. (See the "Understand IT Equipment Energy & Annual Water Usage" sidebar for the equations.)

To get the full effect of the WUE metric, you have to start metering it. And by monitoring your data center's WUE, you
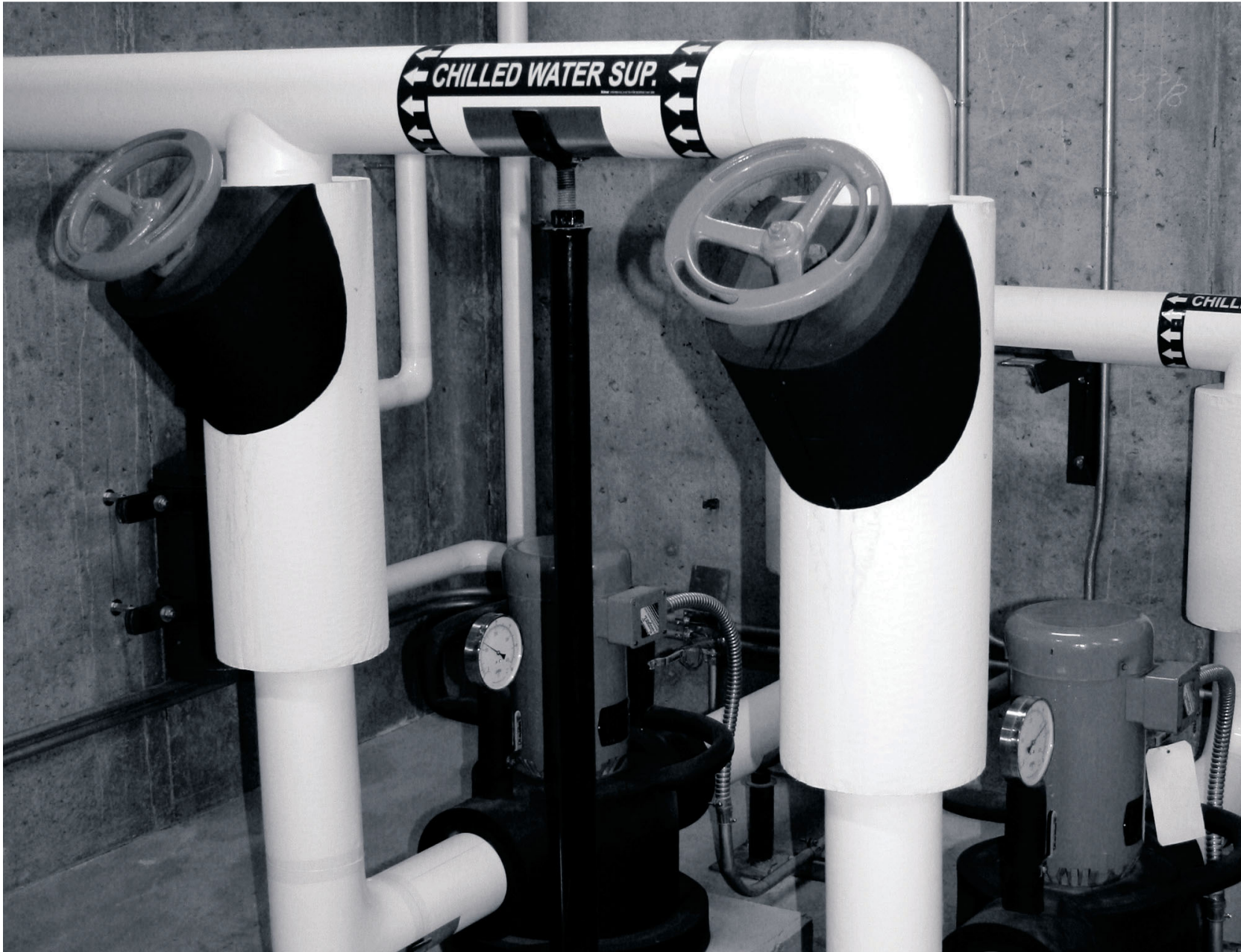
will immediately spot potential changes. "If you're in a data center that has gone to a heavily virtualized architecture, you may have your processors on a particular board running at peak or 80% utilized as opposed to another bank of servers that's throttled back and at idle," Tuccillo says. "You're certainly not going to want to provision 100% of the water to both of those rows. What you're going to want to do is provision it to where it's needed. You need the visibility and management over it."

✔ *Improve Energy Efficiency*

It may sound contradictory, but the best and possibly easiest way to improve your data center's WUE is to improve your energy efficiency across the board. Tuccillo says that it's important to create a balance between your different cooling techniques. For instance, if you only use water-based cooling techniques, then the air temperature in your data center may rise due to lack of fans. This can cause air conditioning units to be overworked. But if you can balance fan-based cooling, decrease the air temperature in the data center as a whole (possibly through free air cooling), and use less water, then you've found a balance that will positively impact your WUE.

✔ *Create Balance In Your Data Center*

There are many ways to both positively and negatively impact the WUE level of your data center. Some of these tactics only require you to tweak your existing systems to make sure that you are using water cooling, physical cooling equipment, and free air cooling in harmony to make sure you aren't unduly taxing one system over another. However, Tuccillo points out that some companies are taking WUE to a whole new level by making it a larger focal point of their operations in an attempt to cool more efficiently and help ease the burden on the environment. For example, one company brings contaminated water in, cleans it, and uses it for cleaning. Then, as the water is discharged, it is actually cleaner than the water that was taken in and is discharged at the same temperature as the inlet, Tuccillo says.

And the interesting ideas for water cooling techniques don't stop there. "There is some really great, innovative work emerging around the globe where data centers are going waterless, some are going with just site water sources, and some are using deeply chilled glacier water," Tuccillo says. "You really need to strike balance between what's right for you at a given time as a part of your overall business model and in consideration of the environmental sustainability attributes of your company in your location. It's going to be different based on where you are and what you're trying to do." P

✔ *Go Beyond Water*

The Green Grid has developed many other metrics that companies can use to improve their data center efficiency, including PUE (power usage effectiveness), CUE (carbon usage effectiveness), and ERE (energy reuse effectiveness). "We're recognizing that not one metric is going to solve the whole problem," says John Tuccillo, president and chairman of The Green Grid. "It's a very complex environment, but by having an agreed-upon methodology to quantify those different conditions, it allows the data center owner/operator to strike the most optimized balance so that you're as energy effective as you can be."

✔ *Understand IT Equipment Energy & Annual Water Usage*

Along with illustrating the actual equations for figuring out your data center's WUE, The Green Grid's White Paper #35 also outlines the components of IT equipment energy and your annual water usage numbers. Your IT equipment energy number includes compute, storage, and networking equipment, as well as supplemental equipment, such as switches, monitors, and workstations/laptops. Annual water usage encompasses several elements, including humidification and water consumed for cooling the data center or data center-associated equipment. The more accurate you can be with your equipment energy and water usage measurements, the more accurate your WUE reading will be.

$$WUE = \frac{Annual\ Site\ Water\ Usage}{IT\ Equipment\ Energy}$$

$$WUE_{source} = \frac{Annual\ Source\ Energy\ Water\ Usage + Annual\ Site\ Water\ Usage}{IT\ Equipment\ Energy}$$

BONUS TIPS:

✔ *Raise Your Operating Temperature*

As with any cooling technique, you can improve your cooling WUE by raising the operating temperature of your equipment, based on ASHRAE recommended limits. The Green Grid's White Paper #35 points out that doing so will "allow warmer chilled water and require less evaporation of water to produce it."

✔ *Location, Location, Location*

The location of your data center can have a larger impact on your WUE than you may think. If you are planning to build a new data center, look for locations with cooler overall climates that provide the opportunity for free air or natural cold water cooling. This can improve your WUE and help minimize power consumption.

Create A BYOD Policy

Take Steps Make Sure It Works For Your Company

CREATING AND IMPLEMENTING a BYOD policy is a sure sign an enterprise recognizes the benefits of employees using their own devices in the workplace. BYOD policies are also an indication that enterprises recognize the importance of securing the company assets employees are accessing with those devices.

But when it comes to BYOD policies, there isn't a one-size-fits-all solution. You need to create the policy that's best for your enterprise, based on balancing employee needs and the needs of the company.

Know What You're Facing

BYOD opens a can of worms where IT considerations are concerned, says Christian Kane, analyst at Forrester Research. "Because the company doesn't actually own the device, it makes it much more difficult to dictate proper usage and make sure that the device is compliant with IT policies," he says. "The application issue is definitely something that makes many firms nervous because they can't actually control which apps a user downloads. Similar to corporate-owned devices, firms are also worried about data stored in apps that have a cloud option to sync."

Define The Company's Stance

A key component of BYOD is first clearly establishing company policy on permitting employee-owned devices to access company assets, says Andrew Borg, Aberdeen Group research director. "Once permission is granted, either implicitly or explicitly, it's more difficult to establish policy," he says.

Borg stresses "policy before action." Actual policy can vary depending on such things as a company's size, if it's public or private, or if it's regulated or not regulated. Ultimately, BYOD should involve creating clear, well-documented policy regarding ownership and protection of company intellectual property; requirements for using and accessing company data; and the ability to enforce policy, Borg says. "The technologies required to do those three things vary, but at a high level that's what is essential," Borg says.

Also important is having a "robust mobility management strategy that considers the full life cycle of mobility in the

Key Points
• A BYOD policy should detail which employees are entitled to use the program and who will enforce the policy.
• Consider limiting the types of devices and OS versions you'll support.
• Seek employee input when creating a BYOD policy to fully understand what employees need to do their jobs.

organization, not just the device and not even the data." Eventually, the strategy should entail device, application, and content management; performance monitoring; and the ability to enforce policy, he says.

Seek Employee Input

Obtaining employee input is probably the single most important component in developing a BYOD policy, says Forrester's Kane. "You need to understand how these employees work and what tools will help them be successful in their jobs. What are their pain points? What consumer tools do they use today and why?," he says. IT can construct a BYOD policy alone, but it will likely fail if not created for employees and based on their actual needs vs. perceived ones, he says. Kane advises reviewing your company's workforce and segmenting it based on device need, such as employees who need access to a tablet along with certain tools. Also, ensure that tools for managing devices and correct security configurations are in place.

After implementing the BYOD policy, continuously engage users as to what's working, what's not, and where policy can improve. "It's a work in progress for most firms and going to be an iterative task," Kane says.

What To Include

One key to a good BYOD program is providing employees with the exact terms and conditions upfront. "Spell it out for employees," Kane says. "Have a document that addresses not only how employees should use the devices for work purposes but also addresses how IT will support these devices. Having self-service portals and clear, easily accessible information on what to do in situations is extremely important." Employees must understand and accept a BYOD policy before they're granted access to company resources. Relatedly, employees must know precisely what will occur if they fail to comply with policy.

Entitlement (who can use the BYOD program) and enforcement (who will govern policy) are two key components a BYOD policy should address. Entitlement should detail different support and access levels necessary and employees eligible for reimbursement, Kane says.

"The eligibility requirements will definitely help personalize a policy, because most companies don't open the BYOD program to all employees from the get-go," he says. "Usually it's a phased approach that brings in certain targeted groups first. Ultimately, the BYOD program won't bring a lot of personalization. That really belongs to the users themselves and how they drive innovation forward."

Aberdeen Group's Borg recommends that policy address specific devices that the company will support. Best practice is supporting limited device types and operating system levels. This approach directly contrasts with an "anything goes" approach, which Borg says is inadvisable. Considering the financial risks involved, Borg says, "it makes no business sense whatsoever when you consider the risks to not enforce policy compliance. It's like having the blinders on." ▣

Top Tips

✔ **Stress device reporting.** Forrester Research analyst Christian Kane says to stress to employees the importance of reporting a lost or stolen device so that IT can wipe corporate data or potentially help an employee retrieve a device.

✔ **Don't overcomplicate matters.** Aberdeen Group research director Andrew Borg says creating a BYOD policy doesn't have to be a huge effort that involves reams of legal counsel and back and forth. "It's common business sense really. By logical extension, if you look at mobility as being core IT infrastructure, it's just the way IT should always be done."

✔ **Put the right tools in place.** In addition to MDM, Dan Olds, principal analyst at Gabriel Consulting Group, recommends confirming that the enterprise's existing security suite has extensions covering mobile devices so that employees' personal data isn't compromised and all devices can be tracked. For organizations that already have strong identity-based security (meaning employees can only access data/applications they need) and existing security mechanisms that have modules for a wide array of mobile devices, "it shouldn't cost all that much to extend those same mechanisms to a BYOD model," Olds says. "But if the existing security is mainly confined to devices inside the firewall—traditional PCs and laptops—then it's going to cost a bit more to acquire and implement a BYOD model."

Action Plan

■ Bring together IT, HR, legal, and other stakeholders

■ Seek employee input

■ Detail specific devices to be supported

■ Outline what IT will and won't do with employee devices

■ Define who is entitled to participate in BYOD

■ Define who will enforce policy

■ Roll out BYOD to a small group initially

Get Started

Forrester Research analyst Christian Kane advises using MDM (mobile device management) tools initially, but "ultimately tools that can better control applications and data will be a must." Such tools are still evolving but on the way, he says. Enterprise app stores are notable, as they enable users to get corporate tools they need in a self-service fashion, he says.

Enterprise leaders also must devote time, energy, and a strong commitment to the fact that mobile enablement requires IT to move away from the traditional stance of one-size-fits-all to a much more contextual-based stance focused on who users are and what they need to do. "This isn't just a commitment to do mobile; it's a commitment to change how support works and how IT approaches business enablement," he says. "It means a decision to stop doing things that just don't make sense for IT to do anymore."

Secure Data Center Racks & Cabinets

Access Cards, Biometrics Seen As Key Elements In Overall Plan

RANDOMLY POLL STAKEHOLDERS about what they feel their enterprise's most valuable asset is, and the answer will most likely be related to data. It makes sense then that data center managers go to great lengths to protect that asset. Traditionally, one means of securing data centers has been the use of security access cards, including at the individual rack and cabinet level. The question, however, is whether access cards still are the best option for securing racks and cabinets or if a security upgrade is in order.

Understand The Limitations Of Access Cards

According to David Orischak, CEO of Digitus Biometrics (www.digitus -biometrics.com), security experts agree that card-access systems are less secure than manual key-based systems. Still, are there data center scenarios in which access cards can prove sufficient?

"Whenever I'm asked this question, my response is the same: What level of risk are you willing to live with in the data center?," Orischak says. As he sees it, card-based systems are still only used because enterprises have legacy card systems installed at building and room access points, and they want to prolong their investment.

Typically, Orischak says, data centers embrace a military-style, reduced-concentric circle, card-based security scheme with the idea being to reduce the speed of an attack before it reaches the core, or the data center. An intruder who does reach the core, he says, will usually find server

cabinets unprotected. Orischak points to last year's security breach at the Health Net data center in Rancho Cordova, Calif., as an example. "In the Health Net case, the card access control system proved ineffective," he says. Such a system doesn't show "who is passing through the access point; it only tells you what card is passing through the access point."

See The Big Security Picture

Info-Tech Research Group analyst Jenna Maertz says two primary issues typically prevent greater adoption of rack- and cabinet-level security. First, many server OEMs design cabinets so that it's incredibly difficult to close the cabinet's back. "The cabinets comply with width standards, but we have customers

that are unable to secure the back of the cabinet because of the length being

introduced by some server OEMs," she says. Enterprises, she says, "might not be able to retroactively install security at this level on existing infrastructure." Second, many enterprises view data center security from a top-down, entire-footprint perspective as opposed to securing individual pieces. The mentality, she says, is "why secure each part individually when you could secure the whole?"

Orischak says the majority of malicious attacks on data centers are conducted by insiders, which is why no enterprise can ignore the security risk created by insiders, including where racks and cabinets are concerned. Beyond having greater access to cards, insiders' mobility is seldom questioned, he says. This fact "neuters the idea of perimeter-based, reduced concentric circle access control," he says. "The attackers are already on the inside." Maertz says Info-Tech advises its customers to review employee access rights as often as possible but at least annually. A risk specific to access cards, she says, is the possibility of approved employees bringing guests into secure locations, which is a "huge security breach."

Equip Yourself

Jeff Clark, president and general manager of Lindy USA (888/865-4639; www .lindy-usa.com), says "real" data center security consists of multiple layers and starts by defining who has access to the server room. Start with a locking mechanism at the door, he says, whether it's a key-coded system, badge scanner, fingerprint recognition system, iris scanner, or other device. "Much of this is dictated by budget," he says. Clark notes that rack-mountable cameras are also available. Once a server cabinet is opened, the camera snaps network-distributable shots to identify who is inside the cabinet. Additionally, most server room-level KVM switches provide additional security via the OSD system, which prevents keyboard/mouse access without a password.

Orischak says most experts agree that biometrics is the best alternative for securing mission-critical facilities. Biometric solutions are now less expensive to purchase and operate than card-based systems, he says. Maertz points out that many newer access cards can be programmed to include biometrics. "The employee swipes her card and then places her hand on a biometric reader," she says. "This helps ensure that they didn't just pass off the access card to another employee." Biometrics technology, she says, is becoming more commonplace, and some options, such as fingerprint readers, can be installed fairly inexpensively.

Overall, cabinet-level security costs have dropped dramatically in the past year, Orischak says. "With the appearance of energy efficient bus-based systems, the cost to biometrically secure a cabinet can be less than $500," he says. "In situations where the cabinets are already installed, there may be some costs associated with modification of the lock opening on the cabinet door and/or the modification or replacement of the door." ▣

Top Tips

✔ **Use this equation.** For all organizations, securing data center racks starts with assessing how much risk the organization is willing to live with, says David Orischak, CEO of Digitus Biometrics (www.digitus-biometrics.com). He says the standard risk equation is: Risk = Threat x Cost x Vulnerability, and vulnerability is the only variable a data center manager can control. "If a data center manager is uncomfortable with the current level of risk, he must try to reduce vulnerability," Orischak says. "Dollars spent on cabinet-level security reduce vulnerability more so than dollars spent elsewhere in the data center."

✔ **Guard USB ports.** Jeff Clark, president and general manager of Lindy USA (888/865-4639; www.lindy-usa.com), says that in addition to racks and cabinets, data center managers need to consider guarding USB ports in an effort to protect enterprise data. USB port blockers can prevent authorized access. "Keep in mind that your network is protected from the outside by your firewall. With a thumb drive, a person can easily introduce unwelcome software applications into a network through the USB port," he says. "Not only that, they can retrieve and save sensitive data such as credit card numbers, classified documents, etc."

✔ **Make certain that upgrades make sense.** Info-Tech Research Group analyst Jenna Maertz advises small to midsized enterprises to take caution before investing money and effort into upgrading rack/cabinet security, as "there may be use cases in which this is appropriate and sufficient," but for some enterprises, it may make sense to focus attention on securing the entire data center.

Action Plan

■ Determine if security is needed more at the rack/cabinet-level or entire data center.

■ If an upgrade is necessary, determine what your budget is.

■ Know what your regulatory and compliance requirements are and ensure the potential solution meets them.

■ Ensure you can centrally manage cabinet access in real-time, produce and communicate alerts, and generate audit trails related to cabinet access.

■ Determine which type of rack/cabinet security solution best suits your data center.

■ Compare the solutions' initial and ongoing costs.

Get Started

Before choosing a cabinet-level security solution, make sure to ask several questions first, says David Orischak, CEO of Digitus Biometrics (www.digitus-biometrics.com). Questions include: What is the initial purchase price, how secure is the solution, what are the ongoing system operating costs (cards, powering the system, maintenance, etc.), can the system meet regulatory and compliance needs, is it easy to operate, and is it compatible with the operating environment?

Outdated Equipment?

Here's How You Can Get Some Benefit From Equipment You No Longer Need

NEARLY EVERY ENTERPRISE has equipment that's outdated but still useful. Google serves as a prime example. Since 2007, the company states it has avoided purchasing more than 90,000 new replacement servers by remanufacturing and repurposing its outdated ones, using those for services that don't require high-end processing power. The result is a more efficient and environmentally friendly operation. Another possibility for some companies to deal with outdated but still useful equipment is working with a vendor that can repurpose or recycle it, a solution that can see the enterprise recouping some of its expenses.

First Things First

If you're looking to get rid of or repurpose old equipment, you first need a better understanding of what equipment you have and how it's being used.

"You should identify and know what equipment you have on hand, what's operational, and what's been abandoned or is under- or unused," says Brett Femrite, director of business development for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "You can't do much to get rid of unused equipment until you have completed a thorough audit and identified what can be removed." The inventory auditing process can be both tedious and time-consuming, as you'll want to check out all equipment, including fans, shelves, cables, and wires.

Know What To Reuse, What To Recycle

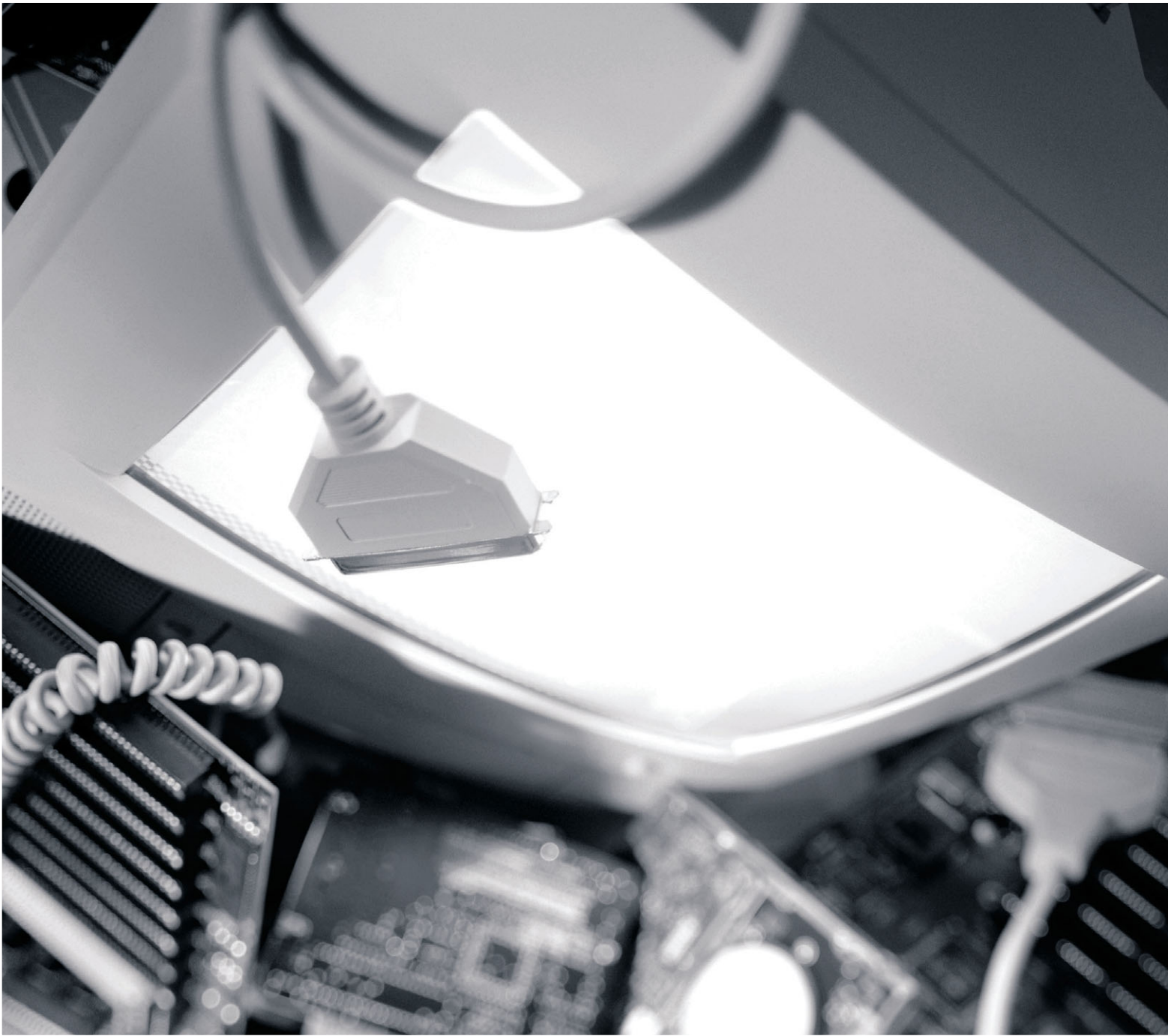Darin Stahl, Info-Tech Research Group analyst, says the economic downturn and virtualization have caused enterprises to view their equipment differently. "The refresh cycle on the equipment has gotten longer, so what that means is there's less available used equipment because they're hanging on to this stuff and wringing every ounce of usefulness out of it," he says. For example, the most common refresh point for servers is five years, but Stahl says 22% of his customers are pushing that to six-plus years. Less than 14%, he says, are refreshing servers at the three-year mark any longer.

UPSes, HVAC units, and other data center equipment were good candidates in the past for recycling and/or reuse, but companies now aren't typically refreshing these until the seven-year mark. In the past, he says, this wasn't a big deal, but "what's gone on if you start looking at the

efficiencies in a precision cooling system or an HVAC unit for a sever room that's five years old, that delta between what you

Key Points

- Outdated data center equipment can be reused for testing environments, backup purposes, less intensive workloads, and other purposes.

- The economic downturn, virtualization, and improvement in efficiency have altered the refresh cycle of equipment.

- Reusing outdated equipment can save enterprises time in deploying new equipment and money in buying or renting equipment for non-critical workloads.

bought five years ago or seven years ago is very dramatic. For me to go out as a buyer, the market just isn't there. Maybe I save some CAPEX, but I more than consume that in OPEX because of efficiency loss if I'm buying used gear." Still, he says, there's a healthy market for such used equipment as racking equipment, raised flooring, and generators.

Know Your Options For Getting Rid Of Used Equipment

One of the most common methods for getting rid of used equipment is a fire sale, but many data centers will need to be aware of who they are selling to.

"A less time-consuming method is to sell to one of the many companies that exist by buying used servers and equipment and refurbishing them," Femrite says. "Bear in mind, often you will receive pennies on the dollar for this equipment, but normally the buyer will pay to pick it up and ship it to their facility and get it off your hands."

Another option is an asset recovery program, which is a service that performs both the IT asset buyback as well as the physical recycling of hardware. Some vendors will even create a fund for your organization so that the money you gain from selling used hardware can be used to purchase recertified equipment when you need new hardware.

When seeking a company that will help with your asset disposal, "Look to work with companies with a reputable asset recovery or refurbishing program," Femrite says. "They can often provide help in determining the value and final disposition of your unused IT assets and offer a variety of options to suit your needs."

Repair Or Replace?

Companies that are looking to save money on their legacy equipment don't always want to replace the equipment with a purchase but simply want to extend the life of their equipment with a repair, says Jason Sutherland, Web and marketing manager at IT Hardware Repair (877/462-6674; www.ithardwarerepair.com).

A company that specializes in hardware repair or asset disposal may be able to tell you if it'd make more economic sense to repair or reconfigure a given product, rather than destroy it or tear it apart for recycling. By maximizing the value of your equipment, an asset recovery service can also help to improve the green status of the company, because you are helping to make hardware sustainable for a longer period of time.

For example, a company where data security is mission-critical will want to go with a service that keeps detailed records of wiping, reset, degaussing, and destruction of your equipment. Many hardware resellers and disposal services will provide you with a complete report down to the final destination of the equipment, whether it be a certificate of destruction or information about recycling activity, such as if it was dismantled into parts for other products. Some hardware disposal companies are even audited by independent auditors to ensure compliance. If you want to continually recycle or resell surplus hardware, you may want to look for a service that will set up an ongoing contract with you.   P

Top Tips

✔ **Not So Fast**

Any equipment embedding proprietary software, such as network or security appliances, isn't a good candidate for recouping expenses, says Info-Tech Research Group's Darin Stahl. That equipment poses potential issues, including lack of manufacturer lifecycle support and availability of patches and upgrades for the equipment.

✔ **Build Goodwill**

Depending on the vendor, Stahl says, being able to demonstrate to executives who place reporting and green-related expectations on you that "you aren't just handing this stuff off to a landfill and it's being handled by a reputable, totally holistic asset-management company with recycling is a good thing." Beyond gaining credits within a reporting regime, he says, "you also buy a lot of goodwill."

✔ **Plan For Outdated Equipment**

From an IT perspective, dealing with outdated equipment should be part of overall disposition planning you do within a hardware asset-management program, Stahl says. Dealing with outdated equipment should "just be an outcome of your end-to-end hardware asset-management program, and just one of the disposition options. Plug it into the backend of that process and don't make it a one-time event or fire sale or yard sale every spring," he says.

Action Plan

■ Audit equipment and document all components

■ Look for internal reuse options for current and future needs

■ Seek bids from multiple, qualified vendors if selling equipment

■ Compare prices for selling vs. recycling

■ Start small to ensure the vendor provides what is promised

Get Started

When comparing vendors that handle outdated equipment, look for ones with end-to-end IT management-asset approaches. Also, ask if a vendor can create a portfolio analysis, describe its valuation methodology, provide secure logistics, offer a chain of custody from start to end, and produce an ultimate disposition report. Also consider certified vendors that are EPA-compliant and seek colleagues' recommendations and look for vendors with several years' experience—ones that participate in tradeshows and industry events and that have received positive user reviews.

BUYING TIPS:
Security

YOU'VE WORKED HARD to build your business up to where it is today, and it's safe to assume that you'd like to keep it that way. But one major security intrusion can put all of your success in jeopardy. With so many security solutions available on the market, it can be difficult to choose the right ones. Here is some advice on what every enterprise needs.

✔ Start With Network Access Control

A network access control solution will limit unnecessary access to your company's internal resources. If you can prevent outsiders from connecting to your network, then there is a much smaller chance of a security breach. Network access control systems can also be used to monitor the mobile device connections of employees working outside the company. Smartphones and tablets are becoming popular targets for hackers, so checking to make sure the external connection is safe and secure will go a long way toward preventing a potential intrusion.

✔ Move Up To Unified Threat Management

A UTM solution goes a bit beyond network access control by essentially creating a gateway through which all users and data has to pass before it lands on your company's internal infrastructure. UTM combines intrusion prevention, antivirus, antispam, and many other features into one solution designed to protect your company.

✔ Don't Forget Email Security & Encryption

Receiving malware-filled messages can result in the infection of one computer or the infrastructure of the entire company. And sending messages with sensitive information no matter what the reason is always a dangerous proposition. As one of the most basic measures, every company should have some form of encryption attached to its email systems. Encryption helps ensure that even if an email is intercepted, it is less likely that a hacker will be able to mine anything from it.

Along with encryption, you'll want to invest in strong antivirus protection to protect servers and endpoints against malicious code and viruses. Make sure the antivirus program you purchase automatically downloads and deploys signature files all the way to the endpoints.

✔ Add In Data Loss Protection

An enterprise DLP (data loss prevention) solution can "offer a lot of capability in terms of preventing the egress of data," says James Quin, lead analyst at Info-Tech Research Group. Such solutions can be expensive, so finding existing tools with DLP capabilities (up-to-date network perimeter UTMs and comprehensive endpoint anti-malware packages) can "deliver at least a moderate level of protection without the excessive cost," he says.

✔ Check For Updates & Upgrades

Once you've purchased and installed your security solutions, the best way to protect your security investments is to regularly update them with free releases and consider upgrading to new versions of the software whenever possible.

Check to see if your security vendor will set up a long-term upgrade plan that will help cut down on costs. As long as it's financially feasible and provides new functionality, updates and upgrades are great ways to lengthen the life of your security solutions. ▣

BUYERS' CHECKLIST

✔ Does the solution allow you to limit access to the network and block unwanted connections?

✔ Can the solution provide a perimeter defense that prevents threats from landing on your servers and other internal equipment?

✔ Emails make it easy to infect computers with viruses and send out sensitive data to hackers, so you should invest in a strong email encryption solution.

✔ Will the vendor help you set up an update and upgrade plan that will let you keep your security solutions up to date without breaking your budget?

KEY TERMS

Mail transfer agent (MTA).
A solution that catches and checks incoming email for threats before transferring it to your internal email platform.

Network access control.
A solution that helps you limit access to your network and lower the chance of an infiltration.

Unified threat management (UTM).
Software (often installed on a managed appliance) that seeks to comprehensively block malware and network threats through features such as a firewall, antivirus, antispam, intrusion prevention, VPN, access policy enforcement, and more.

BUYING TIPS:

UPSes
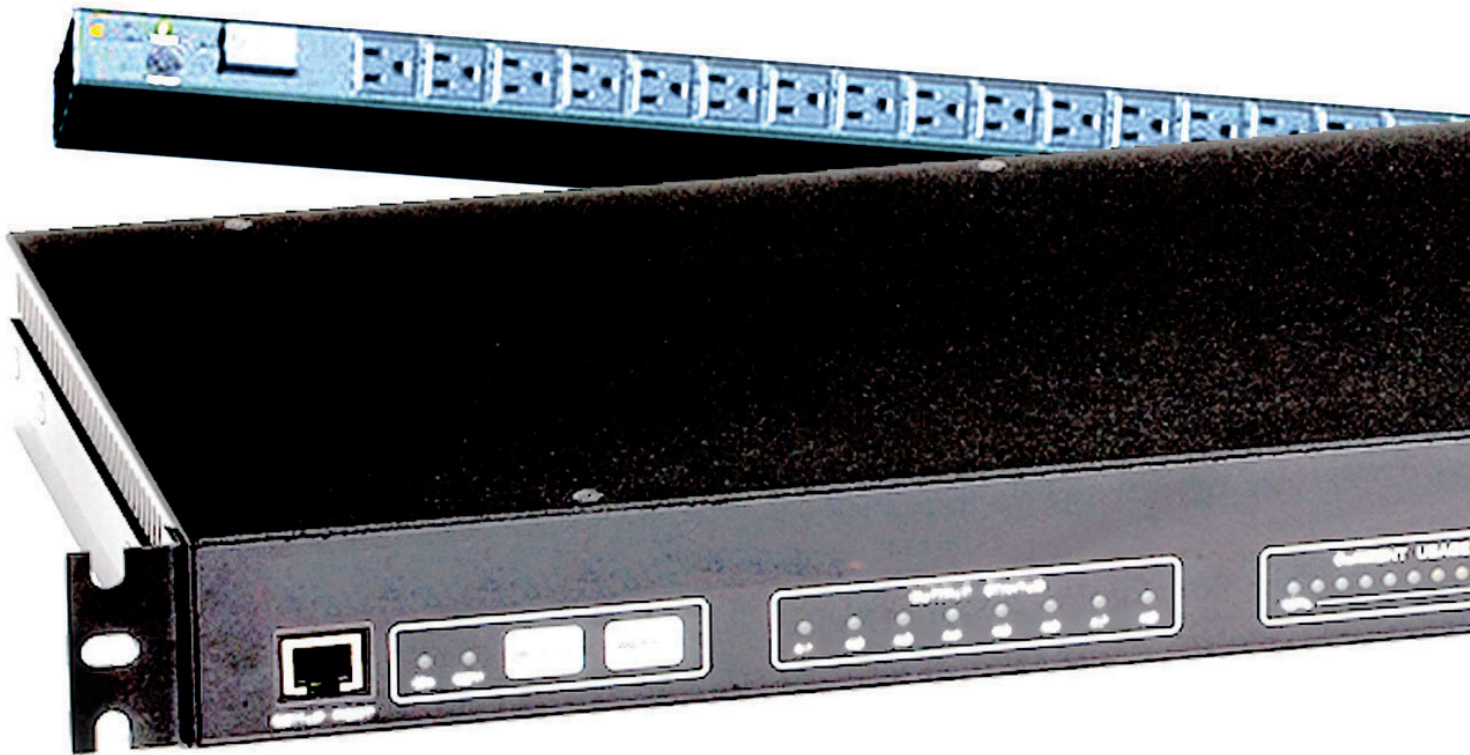
THE IMPORTANCE OF UPSES can't be overstated. If power outages occur and the data center doesn't have UPSes in place that can meet necessary power requirements, the result will be potentially business-crippling downtime.

✔ Learn Your Total Load, Maximum Runtime & Voltage Available

Narrowing down what you need in UPSes can be difficult, and the number of options available can complicate matters. "You have to start with some basics and be armed with some knowledge before making a selection," says Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

Know the minimum time UPS batteries must provide power and the maximum runtime needed. "You'll also need to know the voltage of the electrical service that will power the UPS," he says.

Perhaps most importantly, know the total load of all equipment you'll connect to the UPS, so you can make sure the unit is sized correctly for the load necessary, says Neil Matheson, director of UPS and Special Services at Critical Power Exchange (877/315-4176; www.critical power.com). You'll also need to make sure you have enough physical room to place the needed equipment.

✔ Look To The Future

Along with a firm understanding of the equipment you want to protect right now, you'll also want to consider what equipment you might be adding over the next 24 to 36 months, Matheson says. "A safety margin of 50% for a new installation is usually the rule of thumb to allow for growth."

Also be sure to account for unexpected additions that will inevitably crop up. Doing so will ensure you avoid purchasing a UPS that meets your needs now but becomes outdated in the near future.

✔ Know The Features & Options

The UPS features your enterprise needs can depend greatly on the protection level required for given applications.

"Which option is best for the consumer depends really on them and their environment. Some people plug in a UPS and walk away. Some people go in the other direction and have the units serviced every four months in a fiscal year," Matheson says.

He says key features to look for include external maintenance bypass; cabling cabinets, if needed, depending on the size of the UPS in kVa; and remote eye and/or other SMTP devices to alert system administrators of the UPS' activity or lack of.

Femrite agrees, but points out that, although it's desirable to have a UPS with a high efficiency rating, external bypass switches that enable power to bypass the UPS for maintenance purposes, monitoring capabilities (local and remote), warranties (system, batteries, etc.), and high-performance filtering, "they may not all be needed or cost-effective."

✔ Determine Whether It Makes Sense To Buy Used

There are plenty of used and/or refurbished UPSes on the market thanks in part to companies that have gone out of business or upgraded UPSes with useful life left in them.

But Darin Stahl, Info-Tech Research Group analyst, cautions that the economic downturn has caused enterprises to view their equipment differently. "The refresh cycle on the equipment has gotten longer, so what that means is there's less available used equipment because they're hanging on to this stuff and wringing every ounce of usefulness out of it," he says.

For example, Stahl says, some companies are holding on to their UPSes until the seven-year mark. If that's the case, he says, "Maybe I save some CAPEX, but I more than consume that in OPEX because of efficiency loss if I'm buying used gear."

As with any used equipment you purchase, make sure to check the UPSes carefully, including their history, and purchase from a reputable reseller. ▣

BUYERS' CHECKLIST

✔ Determine your power and protection requirements

✔ Ensure the UPS can handle required loads

✔ Make certain the UPS provides sufficient runtime and capacity

✔ Consider outsourcing battery installation, maintenance, and disposal duties

✔ Determine warranty, insurance, and guarantee requirements

KEY TERMS

Line-interactive.
A UPS with built-in line-sensing abilities to regulate high- and low-voltage levels; an inverter activates when power loss occurs and the system switches to battery power.

Online.
A UPS type providing the highest protection level; the inverter is online and operates constantly to eliminate incoming surges and low- and high-voltage issues while delivering clean power.

Standby.
A UPS type that runs power through surge suppression to connected equipment; after a power outage, the UPS switches to battery backup power, reverting to AC power when power returns.

BUYING TIPS:

Data Center Flooring & Accessories
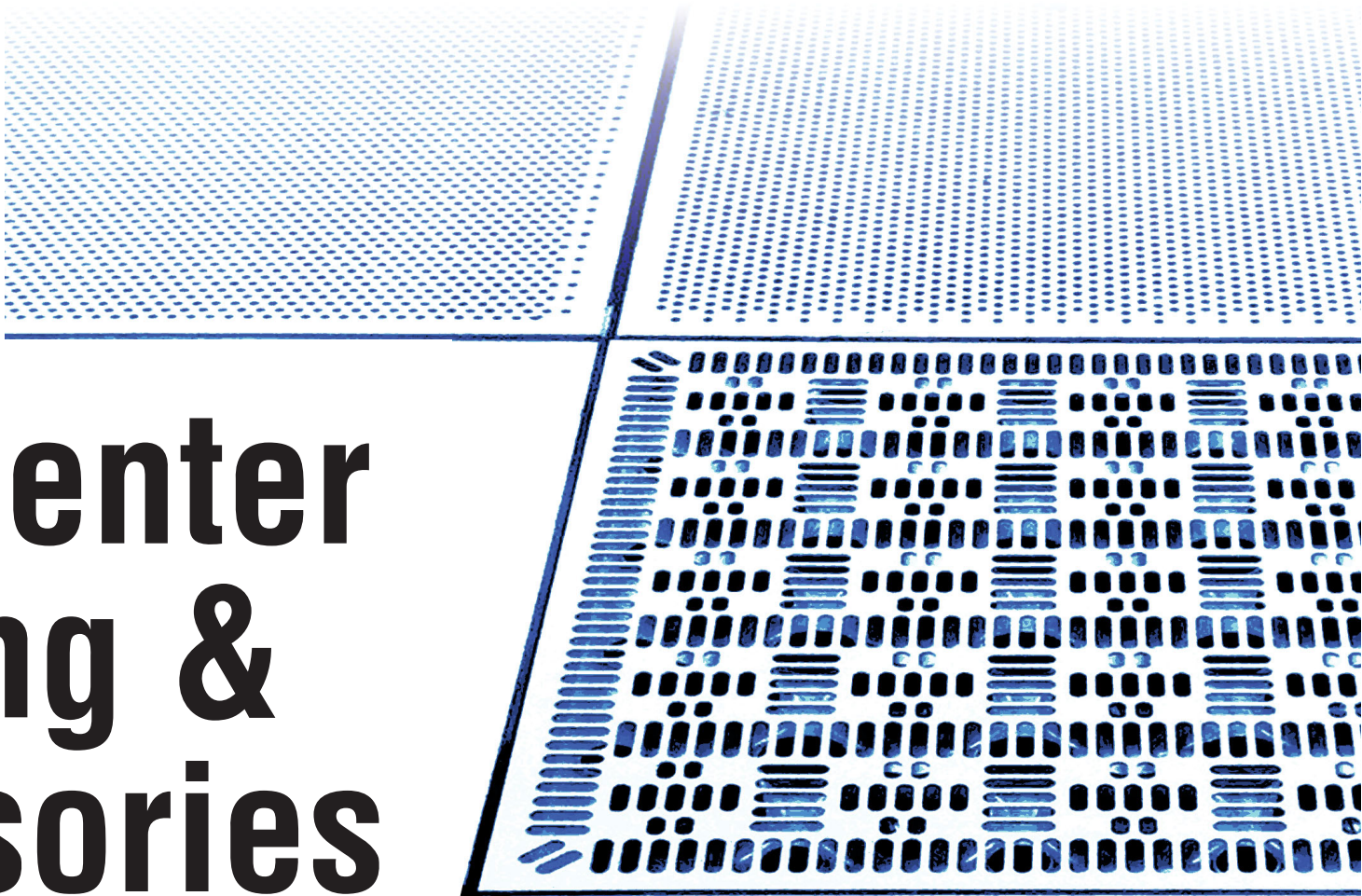
YOUR DATA CENTER'S FLOORING can be just as important as the servers and other equipment it holds. Choosing the right flooring provides a stable, efficiently cooled data center. Here's what to look for.

✔ Know The Weight

Raised floor tiles come in different weight capacities, so consider your weight-bearing requirements when selecting tiles, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). The final floor has to be strong enough to support your equipment at the height of the raised floor. Also be aware of rolling load and use heavy-duty floor tiles where you will be moving equipment in and out of the data center.

Remember as rack sizes grow and densities increase, your floor tiles may need to support a greater weight than you have today. Plan ahead and install floor tiles to meet current and future needs, Koty says.

✔ Check The Finish & Material

Be careful when selecting the floor finish, Koty says. "You don't want to be constantly replacing tiles in high-traffic areas to keep the floor looking uniform."

Avoid floor tiles wrapped in galvanized metal, Koty says, as the galvanized-wrapped tiles could cause zinc whiskers over time. And, if you are using cement-filled tiles, use a sealant to coat any cut edges of your tiles.

You'll also need to consider static dissipation and material weight, says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmount solutions.net). "Data center flooring needs to have a surface that is conducive of static dissipation," she says, to prevent the build-up of static electricity. In addition, she says, "lightweight solutions, as well as 'lay-down' panels rather than bolt-down ones, can make maintenance or swaps significantly easier."

✔ Be Aware Of Cooling & Height

If you can maximize the available space underneath the floor, you can increase your data center's overall cooling efficiency. Also, Koty says, if you want your new flooring to accommodate a hot/cold aisle configuration, make sure to plan your under floor cable layout according to CRAC and PDU/RPP unit locations.

✔ Plan For Cutouts

When installing flooring, a master floor plan should show the location of all cabinets in the full build-out state, says Lars Strong, senior engineer at Upsite Technologies (888/982-7800; www.upsite.com).

Using this plan, it's best to cut cable openings in floor tiles and install products that seal those openings as the floor is installed. Doing so will reduce labor, prevent contamination, and ensure that every cable opening is sealed. "If this best practice is not followed, then it is less likely that the ultimate goals of providing the most reliable and efficient environment, the highest possible power density, and lowest operating cost can be achieved," he says.

✔ Don't Cut Corners

You may be tempted to cut corners to save money, but don't, Viars says. "Don't compromise on the integrity of your flooring. Make sure floor panels fit together as intended (even if it requires custom cutting/sizing), and spring for the additional airflow management accessories. It might cost a bit more upfront, but it will ensure that your cooling remains effective." P

BUYERS' CHECKLIST

✔ Do the flooring panels fit your needs and allow for effective cable management?

✔ Is there enough open space underneath the floor for cable routing and cooling?

✔ Does your vendor have a stellar reputation and testimonials from past clients?

✔ Are all sections of the data center flooring capable of handling the weight and traffic to which they will be subjected?

KEY TERMS

Bypass airflow.
Conditioned air that does not reach computer equipment. Unintended bypass airflow can occur by escaping through cable cut-outs, holes under cabinets, misplaced perforated tiles, or holes in perimeter walls.

Concentrated load rating (also referred to as static load).
Rating specified in pounds of force applied over a one square inch area.

Directional airflow.
Airflow panels such as perfs and grates that deliver air directly to the face of the rack.
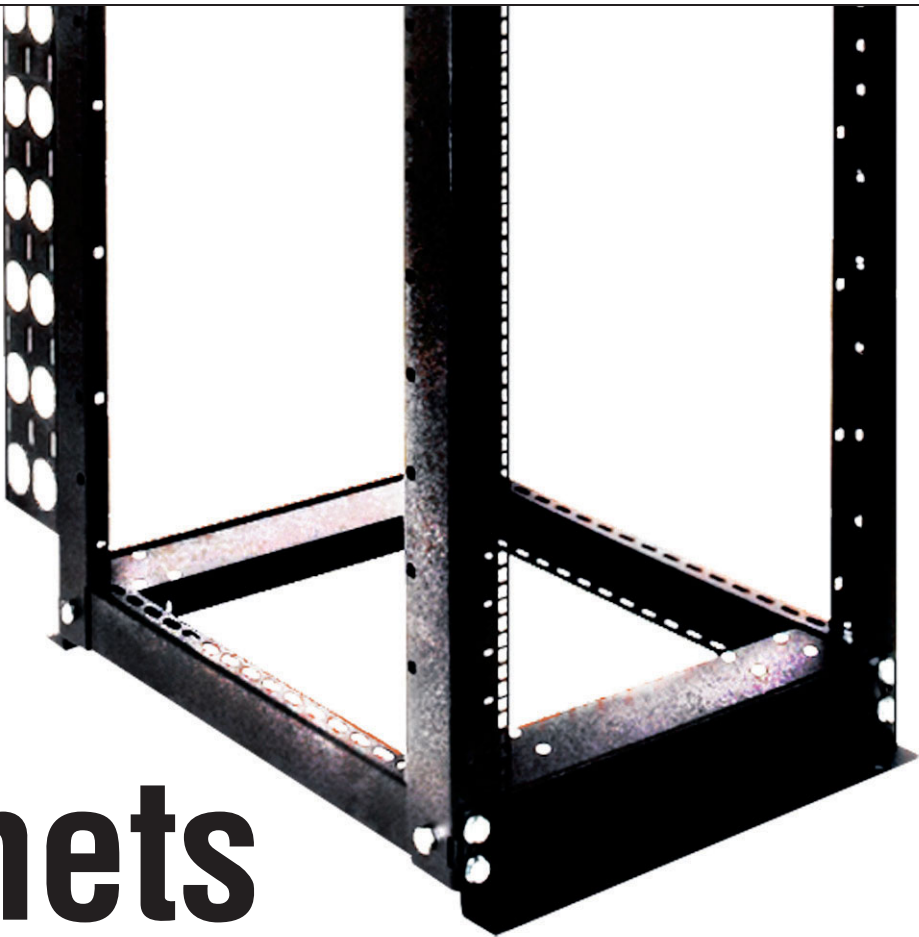
Panel.
The material that makes up the walking surface of a raised floor. Depending on your weight and traffic needs, the panel may be made from steel, concrete with steel reinforcing bars, or aluminum.

Rolling load.
Dynamic (varying) loads that are usually created by moving equipment on casters over the raised floor.

BUYING TIPS:

Data Center Racks & Cabinets

RACKS AND CABINETS are built to hold and protect every piece of equipment that runs your data center. Because of that, the decision of which racks and cabinets to purchase shouldn't be hastily made. Instead, you should focus on the features most important to your company and ensure they will fulfill your needs for years to come.

✔ Know What's Currently On The Market

The first thing you should do when looking at racks and cabinets is research what's currently on the market. Companies offer full-sized 42U, midsized 26U, and 12U cabinets as well as racks with heights of 30 to 84 inches and widths of 24 to 36 inches.

Eli E. Hertz, CEO and president of Hergo (888/222-7270; www.hergo.com), says you should look for potential add-on items, such as overhead storage compartments, power and cable management solutions, and back and side panels. Different sized racks and cabinets paired with additional solutions can help you design a product that's perfect for your data center.

✔ Pinpoint Your Needs

Once you know what products and configurations are available, look at the types of physical features you need for your specific environmental needs.

"Establish what you need the cabinet to do," says Susan Wynne, senior sourcing specialist for Rackmount Solutions (866/207-6631; www.rackmountsolutions .net). "If the equipment is noisy, you may want a sound reduction cabinet. If the environment is dirty, you may need a filtered cabinet. Even the area of the country is important and you may need an air-conditioned or NEBS cabinet."

There are many other considerations you must make, including whether you have a sprinkler-based fire suppression system that requires NEMA 12 certified cabinets that keep out moisture, Wynne says. You should also consider built-in security measures, such as locked cages or other alternatives, if there is a lot of traffic in and out of your data center.

✔ Check The Vendor

Hertz says that a cabinet or rack purchase is significant and so the decision of which vendor to buy from is just as important. "You need to make sure that the supplier they have chosen has been in business long enough to have an established reputation in the market," he says.

Hertz says companies should be able to "grill the supplier on what they are actually going to be getting," and the vendor should be able to answer those questions by knowing "the product from nuts to bolts." Think of the vendor as a partner in the purchasing process and make sure it gives you enough information to make the best possible decision.

✔ Get The Right Fit

In most cases, you've already decided which pieces of equipment to buy for your data center before you start shopping for the racks and cabinets to store them in. It's a great opportunity to measure each piece and come up with a mock configuration for how it will fit into the rack or cabinet.

"This ensures the cabinet is tall enough, wide enough, and deep enough to handle the longest piece of equipment to be populated into the cabinet," Wynne says.

But don't let internal space be your only focus, because the amount of space the rack or cabinet takes up is equally important. "Make sure the outside dimensions of the cabinet will fit in the designated location," she says. Whether you are purchasing multiple racks and cabinets to fill a brand new data center or buying one to fit into an existing setup, it's important to know every dimension. And make sure you leave adequate space for expansion in the future. If you don't, you could get stuck with a cramped and inefficient data center with no room for evolution. P

BUYERS' CHECKLIST

✔ Is cable management built in, or does the rack or cabinet leave adequate space to neatly route cables?

✔ Does the rack/cabinet provide PDU mounting options?

✔ Does the cabinet include PDU mounting brackets?

✔ Does the equipment you're mounting require tapped or M6 holes?

✔ Will you need to disassemble the rack/cabinet to get it in the room?

✔ Is the cabinet lockable to prevent potential security issues?

KEY TERMS

M6 holes.
Square holes common with rackmount equipment and server cabinets; they can be adjusted to a round hole with a cage nut.

Rackmount units (RMU).
Cabinets and racks are measured in rackmount units, with each RMU, or U, equivalent to 1.75 inches.

BUYING TIPS:
Used Equipment

✔ **Understand The Testing Process**

When a vendor purchases used equipment for resale, a visual inspection and diagnostics test are usually the first steps in the testing process. Technicians ensure that components are complete, that they're operating at the original specifications, and that everything is current and in proper working order. But successfully getting through the diagnostics phase doesn't mean that a piece of equipment is home free. Other factors can still move items from the refurbish line to the recycle heap. Used and refurbished equipment dealers look for problems such as cosmetic repairs that require too much time to fix or signs of pending equipment failure or tampering.

As a buyer, where applicable, you'll want to be sure the equipment you're buying has been tested and updated with any new BIOS or firmware levels. And whether you're buying equipment from someone else or selling your own, make sure the data has been wiped clean to avoid security breaches and data loss.

✔ **Know The Signs Of Possible Counterfeit Equipment**

Hardware is at risk for counterfeiting, especially equipment with recognizable, higher-margin brand names. Counterfeiters don't mind investing more money into making good fakes, and, unfortunately, it's not always easy to spot these fakes. If equipment is in its original packaging, pay attention to the quality. As always, know who you're dealing with and research the reputation of the company you're buying from, then be sure you know the recourses available should you discover something is counterfeit.

✔ **Pay Attention To Part Numbers**

Savvy buyers of used and refurbished equipment check part numbers ahead of time, because you don't want to receive equipment that's close to—but not exactly—what you thought you were getting. Check to make sure that components carry only original part numbers, so you know exactly what you're buying.

✔ **Ask Your Vendor For A Trial Period**

Inspecting equipment before you buy it can be difficult, but you may be able to swing a brief trial period. Be sure to test and inspect the components and contact the vendor if you find any defects.

The payment method you choose could also offer safeguards, such as the dispute resolution available through most credit card companies. Depending on your company's buying position and relationship with the vendor, you may also be able to get a sample piece of equipment. This is often a good route for data centers looking for multiple identical components or considering a shift to a new manufacturer or platform.

✔ **Know Your Warranty & Return Policies**

Knowing how a supplier handles equipment returns is an important factor in any purchase decision. Warranties are only as good as the company offering them, so do your homework. Reputable companies provide faster turnaround on advance replacement exchanges, they may waive restocking fees, and they offer better support options.

Also, find out if you'll need to hold onto the original packing material until your warranty period expires. Some suppliers won't accept returns unless they're in the original packaging, while others are less picky. Customers should ask about the requirements when making their purchase so that a return isn't refused because someone inadvertently pitched the original box.

Even if a supplier accepts your returned equipment, you might not get your money back and instead will get a return for credit. If your equipment purchases are infrequent, your money could be tied up until you find something else you need to buy.

USE PROCESSOR.COM
TO FIND DATA CENTER EQUIPMENT

Looking for help pinpointing the products you need, from vendors you can trust? Finding the equipment you need is easy with *Processor*'s online Data Center Products For Sale database.

From *Processor*'s home page (www.processor.com), you can search for a specific part number, make, model, or description. Enter the information in the appropriate box and click Search. You'll see a list of available equipment. If you don't see the particular piece you're looking for, scroll to the bottom of the search results page to conduct a more detailed search. There, you can search by part number, model, price, location, and more.

Don't know the specific part number or model? Use the drill-down search on the *Processor* home page to view results from specific manufacturers. Simply click the manufacturer name, and you'll see a list of all equipment listings from that manufacturer.
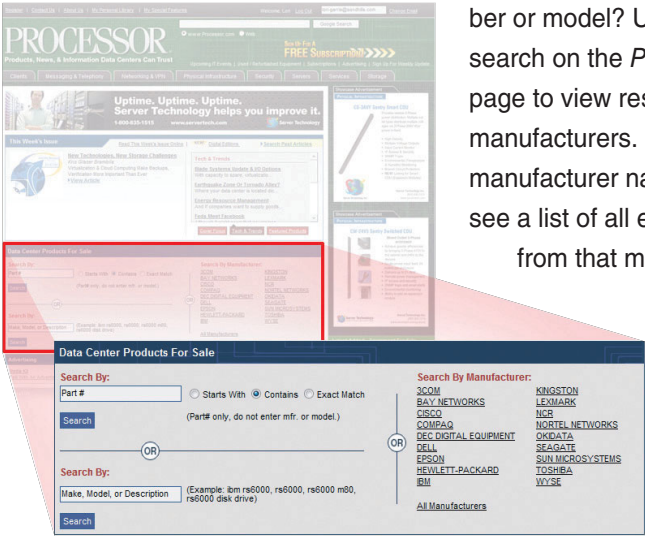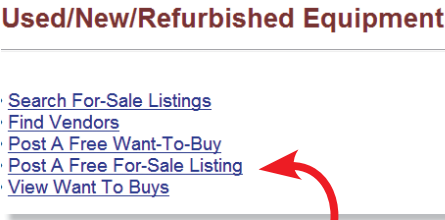
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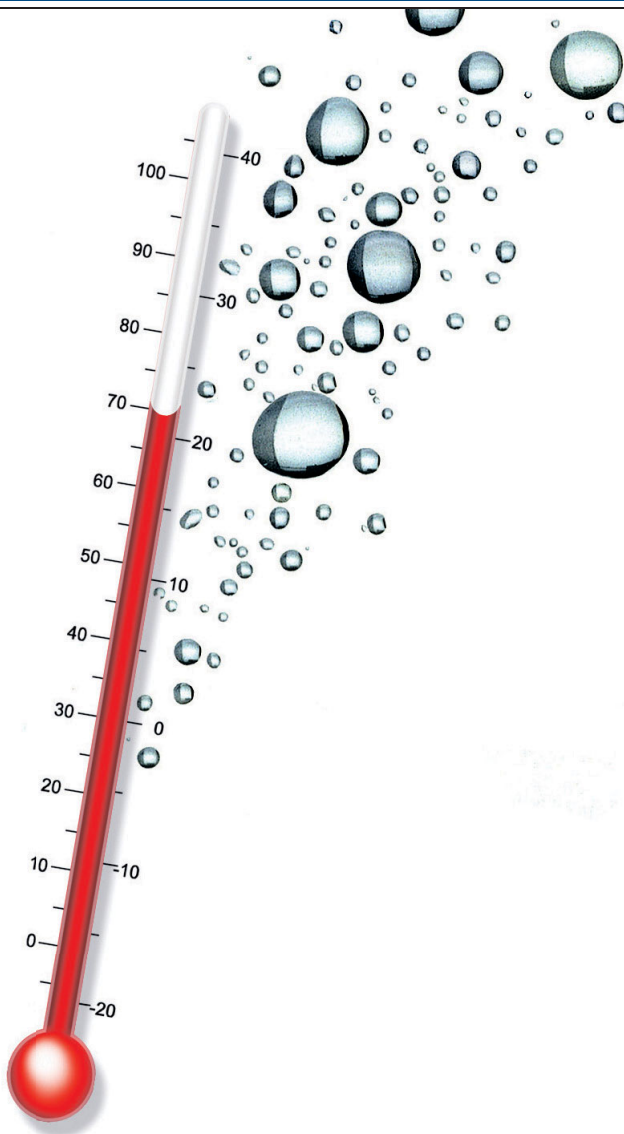**On the Processor.com home page, click Used/Refurbished Equipment.**

Used/New/Refurbished Equipment

› Search For-Sale Listings
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Follow the on-screen directions from there!

BUYING TIPS:

Environmental Monitoring Equipment

ENVIRONMENTAL MONITORING offerings are not things an enterprise invests in on a whim. Every organization has unique infrastructure limitations, climate issues, and monitoring needs, so there's no one-size-fits-all solution. Here's what to look for.

✔ Define Your Goals

Jim Fink, consultant at Upsite (888/982-7800; www.upsite.com), says you need to first define your goals in implementing a monitoring system, including whether you'll be using it for troubleshooting, efficiency benchmarking and goal tracking, trend analysis, forensic analysis, or other issues.

"Decide which parameter must be monitored (pressure, temperature, humidity, etc.) and understand the installation and IT burden on your organization. How many IP addresses, how many monitoring points, and how much network traffic will be created? Will you use wireless or wired sensors? How will the data be presented?"

Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says you also need to know what types of threats might occur. "The most common environmental risk is excessive heat within the cabinets, so you'll definitely want to make sure you are monitoring temperature," she says. Other potential environmental dangers include power surges/loss of power, humidity, smoke, airflow, and room/cabinet entry.

✔ Understand What's Available

With so many choices, it's tough to know where to start. Harry Schechter, founder and CEO of Temperature@lert (866/524-3540; www.temperaturealert.com), says ease of use and reliability are the two most important features to look for. "Choose a product that provides just the features you need, and this will ensure you're getting something that will be intuitive to set up," he says.

When it comes to connecting monitoring equipment to the network so that it can send alerts, several options exist, Schechter says. USB, Wi-Fi, and Ethernet remain popular, but there are also newer infrastructure-independent devices based on cellular phone connections.

No matter what system you buy, make sure you get all the components to complete the system, Viars says. "Most systems have a main console, and in addition to that, you'll need to purchase various sensors based on what you are looking to monitor specifically." Some sensors might require a power source, so consider that when planning your layout.

✔ Install & Monitor

A state-of-the-art environmental monitoring system is nothing without notifications. Bob Douglass, vice president of sales and marketing at Sensaphone (877/373-2700; www.sensaphone.com), says, "The primary motivation for adding an environmental monitoring system is to know when you have a problem as soon as possible." Common notification options include email, LEDs, audible alarms, beacons, sirens, Web alerts, SNMP, automated phone calls, and SMS.

To avoid false alarms after you've installed your environmental monitoring solution, let the monitor run for a few hours so you can see the natural cycle of temperature and other sensors, Schechter says. Once you have a chance to review what a "normal" graph or sensor reading looks like, you can set an appropriate high/low threshold, Schechter says.

✔ Consider Long-Term Support

Choosing the right solution means little if you don't have long-term support. "Look beyond the checklist and make sure that you're getting future enhancements, that you have access to support, and that the company stands behind its products" says Michael Sigourney, senior product specialist at AVTECH (888/220-6700; www.avtech.com). P

BUYERS' CHECKLIST

✔ Do you need to monitor remote or local systems?

✔ Do you have wired networking or power limitations?

✔ What kinds of notifications do you need?

✔ Do you have other monitoring needs beyond environmental?

✔ How many and what types of sensors do you need?

KEY TERMS

Dry contact.
Refers to an electrical contact that has no internally available voltage.

SEMS (Server Environmental Monitoring System).
Records and reports the environmental conditions of servers and clients.

SNMP (Simple Network Management Protocol).
A network protocol that lets users monitor network availability and performance in addition to a variety of other devices such as power and cooling systems.

BUYING TIPS:

Equipment Recycling & Disposal

THERE COMES A TIME WHEN enterprise equipment becomes outdated, needs to be replaced, or is simply no longer of use. Such situations require getting rid of the old to make room for the new. One option for dealing with old equipment is reusing it in another capacity, such as repurposing a once high-end server for an application that doesn't demand mission-critical performance. Another option is using a vendor that specializes in refurbishing, recycling, and disposing of old equipment.

In addition to handling equipment in an environmentally responsible manner, a vendor can ensure you abide by privacy and compliancy regulations. When it comes time for you to find an equipment recycling and disposal vendor, the following advice can help.

✔ Make The Most Of Dealer Options

When comparing service providers, examine what the services are offering, says Brett Femrite, director of business development for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

"Some of the larger companies charge for asset disposal, while others will pay you for the equipment. Smaller regional companies can often provide more cost-effective solutions because of local transportation, labor, and processing," he says. Companies that offer to pay you may provide such things as revenue sharing and the ability to purchase other refurbished hardware.

"Ask for referrals, performance reports, or projections up front. Looking at past disposal lists will make it easy to forecast what you can expect," Femrite says.

✔ Check The Facilities & Processes

Ask prospective vendors if you can physically inspect their facilities, what security and surveillance they use, how they can assist with ROI for current projects, and what documentation processes they use.

Be sure to find out how equipment is picked up and handled, who pays for shipping and transport, how equipment is processed and how long it takes, where equipment winds up, when you will get paid, and if the vendor can assist in other ways such as providing new products or offering credit from old equipment. You also should check what current accounts the vendor has and if it uses downstream vendors and who they are.

✔ Onsite Or Offsite Data Destruction?

With data destruction, you have two choices: onsite or offsite. With an onsite service, you'll remove the need to deal with a chain of custody documentation. For data centers that store a lot of sensitive data and want to physically destroy the data, you'll enjoy the peace of mind that comes with watching the destruction take place.

If you want absolute destruction that's beyond any type of recovery, an offsite data destruction service may be ideal as service providers typically have more powerful shredders at their facilities than mobile shredder services can offer, plus a number of offsite data destruction services also double as a reprocessing center that can remarket the parts, so you can get some return value for your used equipment. P

KEY TERMS

Data wiping.
A process used for compliancy and privacy reasons in which data is entirely destroyed or erased from equipment such as hard drives.

Refurbished for reuse.
Old equipment that has been restored to be resold or donated for continued use rather than recycling individual components.

BUYERS' CHECKLIST

✔ **Homework.** Compile a list of equipment you no longer need, then determine its resale value, what businesses might purchase the equipment, and how the resale value can help fund new purchases.

✔ **Qualifications.** Determine how long the prospective vendor has been in business, what its reputation is in the industry, and what compliancy and certification measures it operates by and has achieved.

✔ **Broker or provider.** Determine if the vendor actually provides recycling and disposal services or is just a broker of such services.

✔ **Process.** Clarify the methods the vendor uses to process equipment, including who handles equipment, where it goes, how long processing takes, and what documentation you can expect.

Buying Tips:

Networking
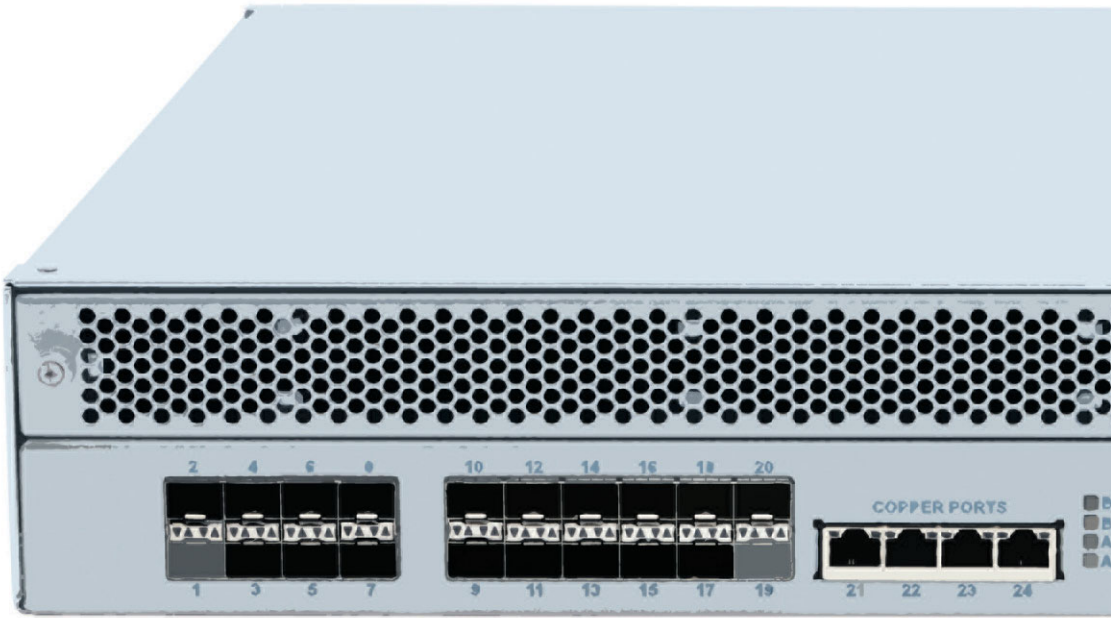
The health of a company's network is crucial to its productivity. As such, choosing the right equipment to run your enterprise network can't be taken lightly.

As you evaluate how you're going to manage your unique network and improve metrics overall, here's what to watch for.

✔ Seek Advice

The road leading up to actually buying next-generation network gear should be filled with staying current on standards, protocols, and vendors' proprietary features. Doing so, says Rob Enderle, principal analyst for Enderle Group, can save time in narrowing down vendors and exactly what equipment is available that can meet specific needs. "Like a fine wine, you don't implement a standard before it's time, but you don't want to be excessively late, either," Enderle says. "Otherwise, you'll likely pay a premium for aging technology. Stay informed."

✔ Look For Cost-Effective Upgrades

It's important for small to midsized enterprises to look for ways to upgrade networking equipment cost-effectively. Eric Hanselman, research director, networks, at 451 Research, says a first step is assessing the performance of the various components of the network.

Surveying networking performance can pinpoint whether core, edge, or access are areas that need attention. Wireless performance can be more complex to accurately assess, Hanselman says. Because the radio frequency performance varies with physical building constraints and the wireless devices involved, companies may need to enlist expert help. "Simply adding more access points can often make a bad situation worse," he says. Alan Weckel, Dell'Oro Group senior director of data center appliance, enterprise telephony, and Ethernet switch market research, adds that reducing spare capacity is the biggest way to cut costs.

One possibility for cutting costs when upgrading core networking gear is acquiring used or refurbished components. Hanselman says such gear can offer reasonable value, "as long as it's still actively supported by the manufacturer." Support, he says, must include the firmware and OS. "For some manufacturers, equipment components can be upgraded without replacing a whole chassis," he says. "Control

or supervisory module upgrades may be available in both new and refurbished equipment." Weckel sees this approach more as an option for smaller enterprises, "as a switch from a Fortune 50 company that is three years old is still probably feature-rich for what an SMB may need."

✔ Go To The Core

Core network upgrades can add capacity that elements at the network edge can leverage, Hanselman says. "This is a good investment if there is congestion in the core, and this is often the case," he says. "If access performance is a bottleneck, either for devices or for traffic headed to the Internet or wide area network, a core upgrade won't make a noticeable difference."

✔ Bargain For Better Prices

Vendors are often willing to get aggressive with pricing, especially if they know competitors are in the picture. Pin your list down to two or three vendors that you'll be happy with and then start bargaining.

Where the ideal time to buy is concerned, Enderle says it's helpful to have someone you trust who is active in the standards efforts in on the decision "so they can tell you of the pitfalls and help you with timing," he says. "This ensures you neither buy early nor late."

✔ Take Your Time

Spending the time necessary to implement a network refresh correctly can result in time and money savings later. "Much of the cost connected to any technology change is the result of mistakes that result in the firm buying what they don't yet and may never need and in undoing bad decisions," Enderle says. P

Buyers' Checklist

✔ Is the product designed for the needs of a small to medium-sized enterprise?

✔ Is purchasing used equipment an option?

✔ Are we up to date with current standards and protocols?

✔ Is this upgrade something we will take advantage of now or in the near future?

Key Terms

Gigabit Ethernet (GbE).
Technology for transferring information at the rate of 1 billion bits per second. Other high-speed standards include 10GbE, 40GbE, and 100GbE.

IPv6.
A new communications protocol designed to replace IPv4 and prevent the problem of running out of potential IP addresses. IPv6 uses 128-bit addressing, compared to IPv4, which uses 32-bit addressing.

BUYING TIPS:

Cable Management Solutions
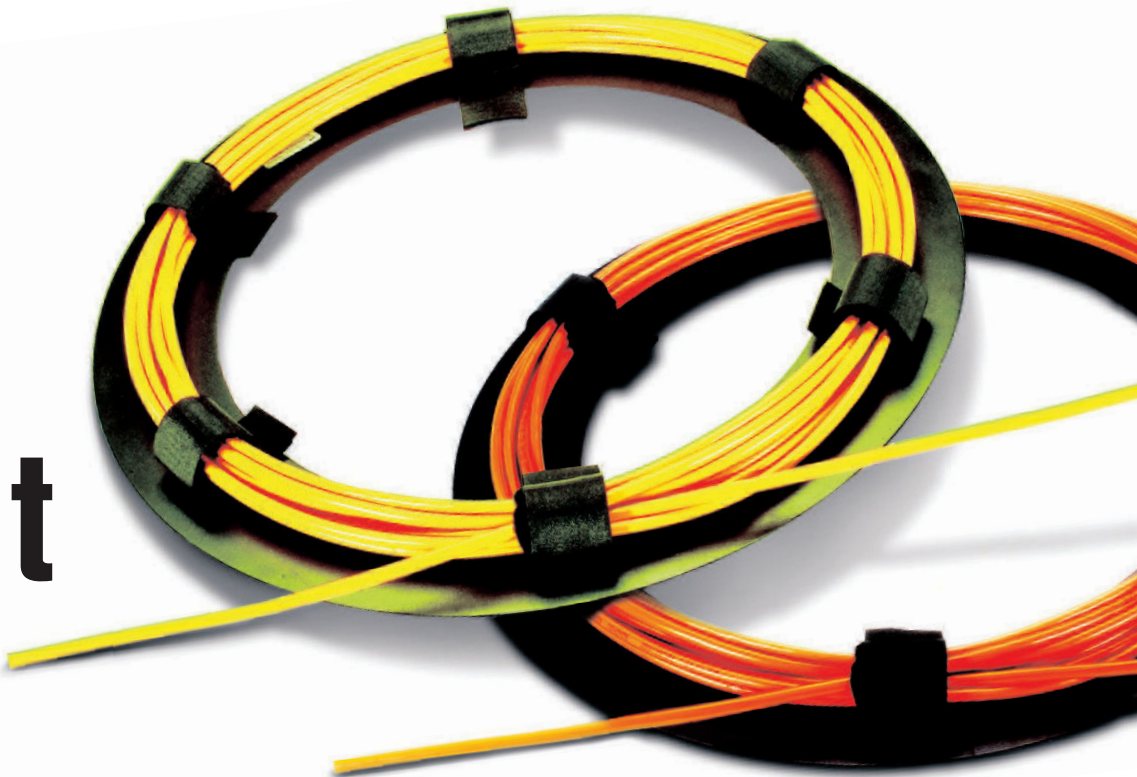
MANAGING CABLES is an afterthought. That's an unfortunate reality among many data centers, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). Among other things, not having a cable-management plan and guidelines makes troubleshooting problematic.

✔ Know What's Available

Brett Femrite, sales manager at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says well-designed patch cable storage managers, which house and cover patch cords between patch panels and devices, are popular. He says they are not only functional in helping reduce cable sprawl, but they are also bend-radius-compliant and offer cosmetic appeal. Other cable management options include horizontal and vertical wire managers (which can be mounted on the front or rear of your equipment rack or cabinet), cable ladders, a large assortment of cable trays and conduits, and various wire minders (rings) that can be mounted on any rack system.

Also very popular, Femrite says, are vertical and horizontal lacer bars. "These bars can be mounted on a rack or within a cabinet and have slots through which Velcro enclosures or cable wraps are routed to hold groups of cable," he says.

✔ Plan For Expansion

Laura Viars, senior sourcing specialist at Rackmount Solutions, says if you intend to incorporate more equipment in the future, ensure your cable management configuration allows for it. Do this by making certain managers (both in-rack cable managers and external trays and ladders or conduits) don't meet or exceed their fill capacities. Most management options are available in multiple sizes, she says, ensuring a fit with plenty of excess if needed.

Also seek solutions with the flexibility to add new equipment or troubleshoot an existing component. "Lean toward reusable options such as Velcro straps in lieu of cable ties and managers that allow easy access to their contents," she says. Have an idea of when you're looking to expand and by how much. If you expect rapid and near-term growth, keep cables loosely organized during implementation by cutting down on the bundling and by using managers (D-rings vs. managers with covers) offering easier access.

✔ Check Vendor Experience, Warranties & Other Factors

Because cable management systems affect a range of data center infrastructure subsystems, including airflow management and mechanical and electrical distribution, Lars Strong, senior engineer at Upsite Technologies (888/982-7800; www.upsite .com), says a vendor needs to have comprehensive knowledge of data center operations.

Vendors should have experience that matches your business size and type, warranty products and work, offer easy ordering, provide complete solutions and knowledge concerning network configurations, carry parts that fit into your existing systems, and guarantee installation and network performance.

✔ Consider Color & Labeling

Koty says when possible, use color coding to help visually identify cables quickly, simplify management, and save time when tracing cables. With data cables, use color to identify the cable's role/function or connection type. With power cables, use color to identify and organize dual-power feeds for redundant power sources.

Secure labels so they're accessible but difficult to remove. Also, maintain a spreadsheet that identifies the cables and colors, where cables come from and go, and configurations. ℗

BUYERS' CHECKLIST

✔ **The basics.** Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says no matter the size of installation planned, you'll likely need basic management items such as vertical managers to bundle cable along the height of the racks/cabinets; horizontal managers to bring the cabling neatly from the drop to the equipment; and Velcro straps to bundle cables as needed.

✔ **Testing.** Pre-test all cable before installing, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). Once installed, it's more difficult to test and identify problems.

✔ **Think about heating and cooling.** Where heating and cooling efficiency are concerned, Koty says, using overhead racking for network and storage cables will prevent air dams from forming under the floor. Also, be sure your cable management solution keeps cabling out of the way of exhaust fans in cabinets, he says.

KEY TERMS

Cable bend radius.
The minimum radius a cable can acceptably bend and still function as intended.

TIA/EIA.
The TIA (Telecommunications Industry Association) and EIA (Electronic Industries Alliance) provide best practice guidelines regarding cabling infrastructure.

PROCESSOR

Processor Solutions Directory

Here are brief snapshots of several companies offering products designed for the data center and IT industry. Listings are sorted by category, making it easy for you to find and compare companies offering the products and services you need.

You can find more detailed information on these companies and the products they offer inside this issue.

To list your company and products, call (800) 247-4880.

PHYSICAL INFRASTRUCTURE

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PHYSICAL INFRASTRUCTURE

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(800) 523-2702 | www.baytech.net

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Dynamic Power Management & Optimization software that replaces "always-on" data center operations with a more efficient "on-demand" model aimed at cutting power consumption by 50 to 60%.

(408) 980-1900 | www.powerassure.com

PHYSICAL INFRASTRUCTURE

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• Trunk Cable Assemblies
• Multi-strand Cable Assemblies
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(800) 555-7176 | Cablesys.com/pro

PHYSICAL INFRASTRUCTURE

Rack Solutions

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PHYSICAL INFRASTRUCTURE

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